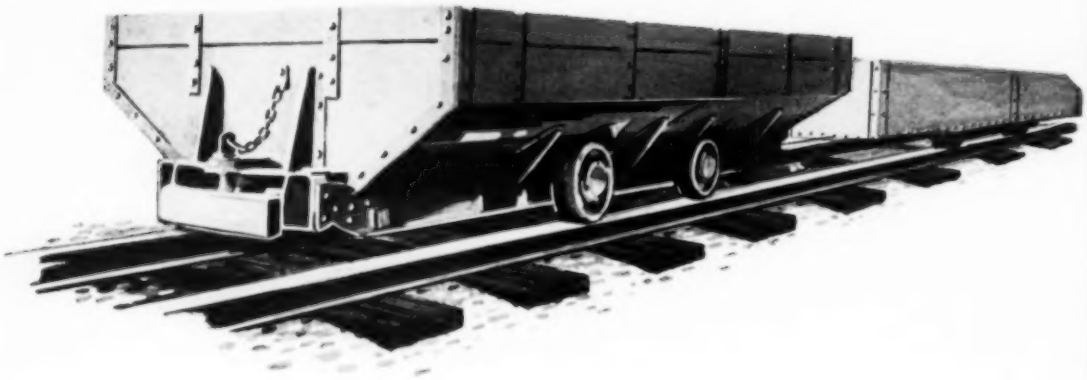
Coal Age

AUGUST, 1952

A McGRAW-HILL PUBLICATION — PRICE 50c

Building Management-Miner Teamwork Today

A 16-page special report on working together at the mine.....p 81



1 mine car does work of 2..!

Actual production figures prove that one A.C.F. *Drop Bottom Mine Car can give you the mining efficiency of 2 ordinary cars.* A sample of 100 important mines 'round the country shows that in a mechanized mine, you can get out the same tonnage with 53% fewer A.C.F. Drop Bottom Mine Cars!

You get an 87% tonnage *bonus* by using the same number of cars. The secret of this increased production is the elimination of delays at the dumping point. Temporary delays at the tipple or the mine face need not stop coal production. The fast automatic dumping of A.C.F. Drop Bottom Cars keeps storage hoppers filled to provide continuous operation of your preparation plant.

If you are interested in the story of greater efficiency with A.C.F. Drop Bottom Cars, get in touch with your A.C.F. Representative. American Car and Foundry Company, New York Chicago • St. Louis • Cleveland • Washington Philadelphia • San Francisco • Huntington, W. Va. • Berwick, Pa.

A.C.F. Drop Bottom Mine Cars cut hours off unloading time...resulting in a substantial production bonus.

A.C.F.

Drop Bottom **MINE CARS**

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Where B. F. Goodrich grommet belts are outlasting others 2 to 1

B. F. Goodrich grommet V belts cut costs 20 to 50%

THOSE nine belts run a sand pump 10 hours a day, 6 days a week. Ordinary V belts had to be stretched extra tight in order to run the heavy pump. In addition to causing bearing wear, the tight fit pressed sand into belts and pulley, resulting in serious wear on both. When B. F. Goodrich grommet V belts were installed, it was found they gave good gripping action, even though not tightened. With belts running at less tension, abrasive wear was cut way down, belt and pulley life doubled, and heavy bearing wear in the motor eliminated. Here's the reason B. F. Goodrich grommet V belts outperform ordinary belts:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio* (available in Canada).

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

YOU CAN'T BEAT THE EXPERT

Whenever his expert eye leaves him in doubt, the modern judge of art calls on infra-red photography and other scientific developments to test the authenticity or age of paintings, frequently making startling discoveries under layers of pigment.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

PHILADELPHIA, PA.

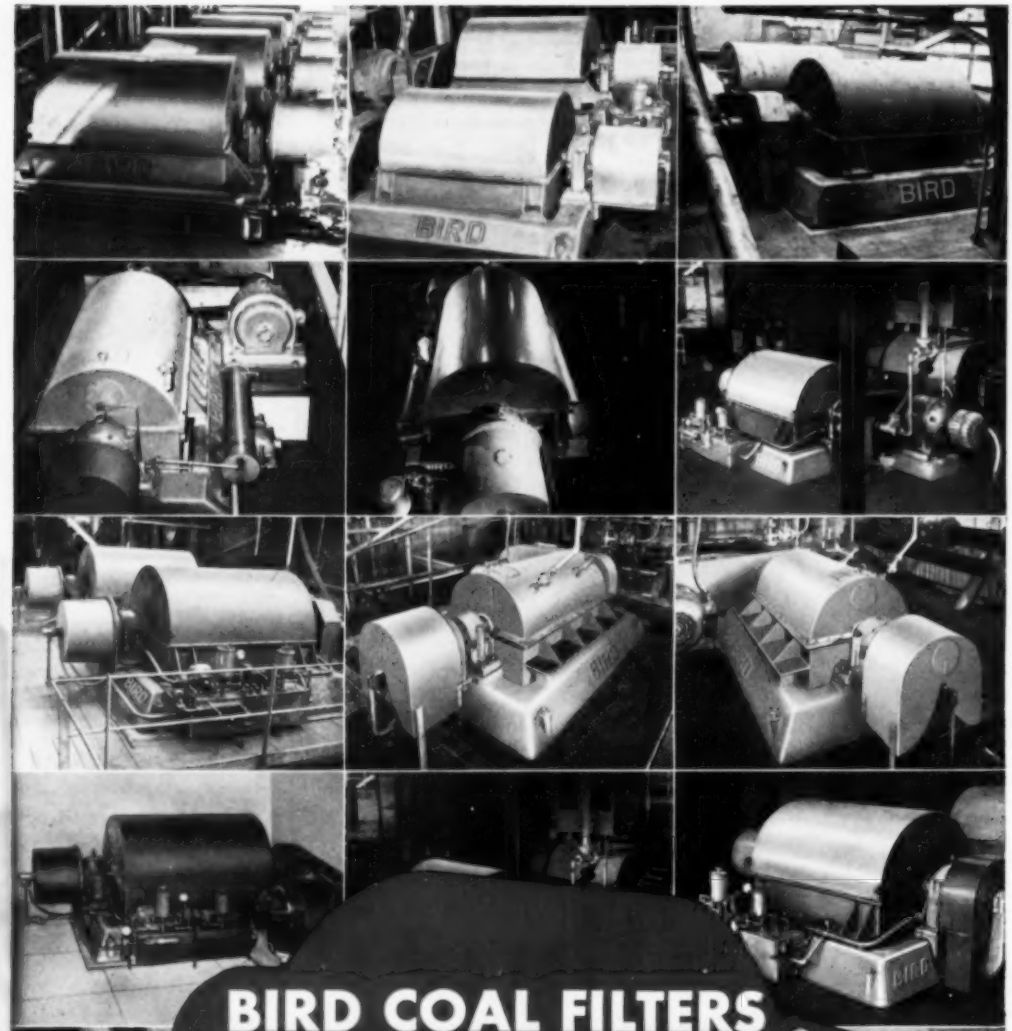
IN HIS SPECIFIC FIELD

...it's the same in Coal Mine Lubrication

YOU CAN'T BEAT THE KNOW-HOW BEHIND

Hulburt Quality GREASE

There's an art to lubricating coal mining machinery the one RIGHT way —and the basic rule is, use HULBURT QUALITY GREASE. You too can get an expert to advise you on this. Just send for a Hulburt Lubrication Engineer and turn him loose down in your coal mine. He may make some startling discoveries that may greatly reduce your machinery maintenance and operating costs.



BIRD COAL FILTERS

have dewatered more than twenty million tons of fine coal to date.

They do the job for seven cents per ton or less, including power, labor, amortization and maintenance.

Used with the Bird Polisher and Water Clarification System you effect a closed circuit. The water can be cleared of even the finest particles.

May we tell you more about it?

BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

AUGUST • 1952

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COMING IN COAL AGE . . .

How to Organize for Safety—A down-to-earth account of the eastern-Ohio program for preventing accidents in mining operations in the area. This regional plan backs up and reinforces the work of individual companies, supplying both coordination and, where necessary, pressure for action. Coal Age presents the why, how and results as another feature in its series designed to help coal men get down to rockbottom in safety.

The Three-Unit Locomotive, how it was developed and what it is doing at Mulga mine as part of a haulage and hoisting modernization program outstanding in conserving labor and promoting efficiency, in addition to breaking a production bottleneck through doubling the capacity of the haulage and hoisting system. Involved in addition to the locomotive is a new belt slope and new high-speed main line.

Efficient Coal Preparation—How Gulf Smokeless gets results in cleaning with heavy density in a new plant designed for handling a more difficult cleaning problem expected in the future. The plant started off at practically top efficiency on the first day.

Narrow-Cut Stripping and Chloride Washing—The story of how Saxton Coal Corp. gets efficiency in production and quality in preparation. Cuts 36 ft wide in the pits speed up both stripping and loading. The 260-tph preparation plant equipped with calcium-chloride unit is designed for disassembly and re-erection to serve widely separated stripping reserves.

Three Voltages Provide Safety and Efficiency at AC Conveyor mine—To comply with state requirements, Timtony mine purchased 220-v equipment. For efficient transmission, it chose 4,160 for the incoming voltage and 440 for intermediate transmission. Grounded neutrals with protective breakers are used on both high and low-voltage circuits.

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KEEP CABLES LONGER

. . . lubricate with TEXACO CRATER

MINE hoist cables as well as wire rope used outdoors *stay strong longer* when lubricated with *Texaco Crater*. This *penetrating* lubricant gives real protection against wear and rust even in the toughest service. *Texaco Crater* gets *into* the rope. Keeps the metal strands coated with a tough, long-lasting, protective film . . . surrounds and protects the hemp core.

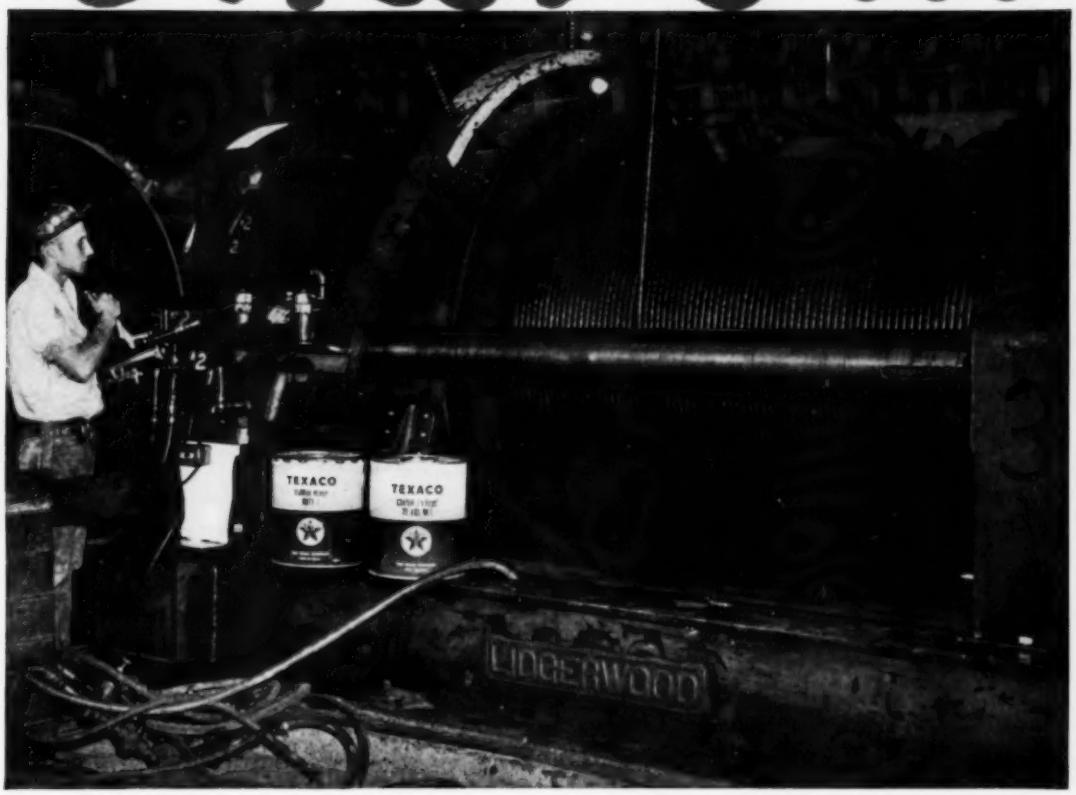
Your open gears, too, will benefit from lubrication with *Texaco Crater*. Its tough protective film clings to the gear teeth, acts as a shock absorber and wear reducer. Gears last longer, maintenance costs less.

If you prefer the convenience of fluid application, use *Texaco Crater X Fluid*. It's the same fine *Texaco Crater* and gives the same long-lasting, superior protection, but it's made so you can apply it easily as a liquid.

TEXACO

TEXACO LUBRICANTS

STRONG...



In hydraulic mechanisms of all types, in use above or below ground, use *Texaco Regal Oil (R&O)* as your hydraulic medium. It prevents sludge, rust and foam . . . assures smooth, uninterrupted operation . . . keeps maintenance costs low.

A Texaco Lubrication Engineer will gladly work with you to simplify your lubrication procedures and bring you added efficiency and economy throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

Faithfully yours
50
for Fifty Years

COMPTON AUGER

Improves product and cuts cost of

STRIP MINE OPERATIONS

The Compton Auger introduces an entirely new and unique method of recovering high wall coal at phenomenally low costs.

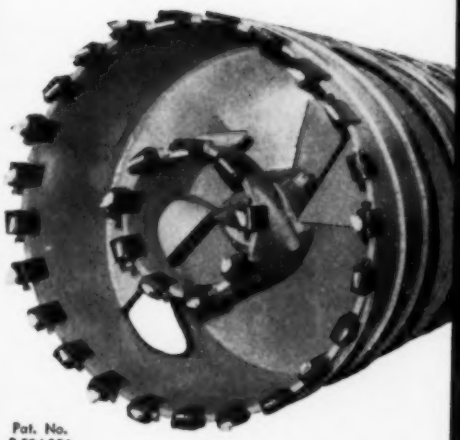
Used in conjunction with your present strip mining equipment you can blend auger mined coal with your regular production and improve the overall quality substantially.

In mines where these machines have been in operation for the past two or three years, the Auger has paid for itself many times. In fact, under normal production conditions it should pay off the investment in six months or less.

From the productive standpoint, the Model 42 shown here has been drilling 42 inch holes to a 189 foot depth and producing up to 500 tons per shift in the Pittsburgh seam. Another example—Nine Compton augers in use by five companies in three states have a total potential capacity of 1,800,000 tons per year based on 200 days of two shift work.

The Model 42 is 42 feet in length—weighs approximately 33 tons—carries nine 21 foot auger sections—requires only a 45 foot minimum pit width—is powered with 225 H.P. Diesel engine—has hydraulic jacks in each of the four vertical frame members which have a lift of 66 inches and permit drilling of overlapping holes—can be equipped with augers from 48 inch to 30 inch diameter.

The Compton Model 56 Auger is 56 feet in length—weighs approximately 50 tons—carries six 34 foot auger sections—requires a minimum pit width of 60 feet—also has a hydraulic lift of 66 inches and permits drilling of single or overlapping holes—is powered by a 300 H.P. Diesel engine—can be furnished with augers from 52 inch to 30 inch diameter—and provides a total drilling depth of 204 feet.



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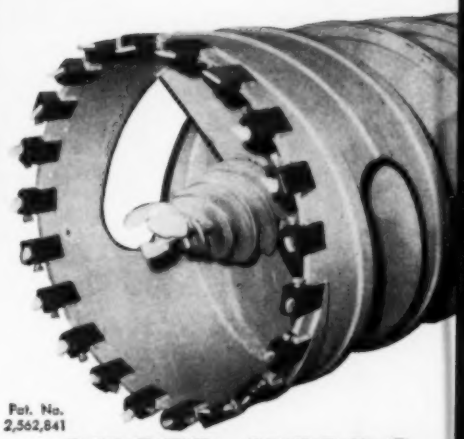

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MINING...

COMPTON *Non-Clogging* AUGER HEADS

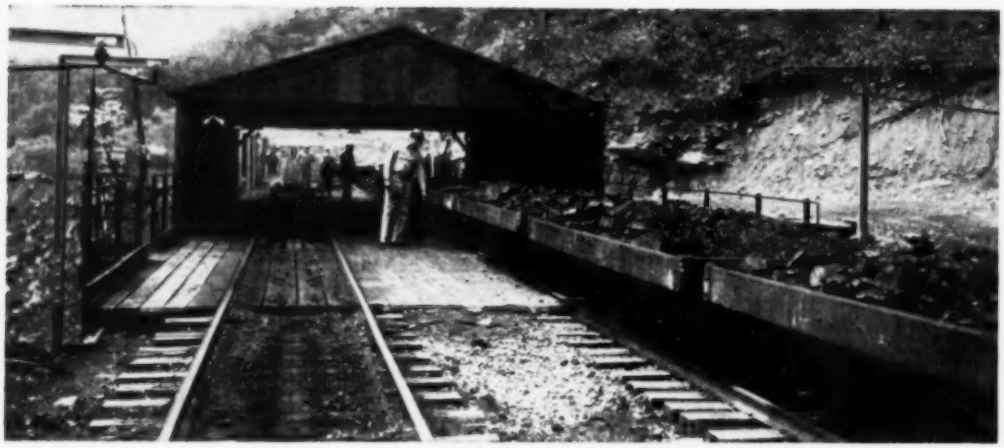
(PATENTED)

The unique cutting heads shown here were designed—developed and built by a coal operating company and their construction adheres closely to long accepted and proved practices of cutting coal. These new cutter heads have two types of core breakers which are interchangeable to meet the requirements of the various seam structures and to produce more and larger lump coal.

The new type heads, capable of cutting coal at high speeds without clogging, assure a continuous flow of coal from head to truck during entire hole cutting operation. Maintaining a constant peripheral speed for all diameters makes it possible to get large tonnages even with the smaller diameter augers.

COMPTON, Inc. ORIGINATORS OF COMPTON LUMP RECOVERY HEAD

Box 1946—Phone 4-6384 **CLARKSBURG, W. VA.**



RED JACKET

TRADE MARK REGISTERED

RED JACKET'S NO. 17...

ANOTHER MODERN MINE INSTALLS THE S-D AUTOMATIC HAULAGE SYSTEM FOR MORE EFFICIENT, ECONOMICAL OPERATION

Red Jacket's Modern No. 17 Mine is another typical example of how modern mines are making a major reduction in coal production costs by installing the S-D Automatic Haulage System. At No. 17 this modern haulage system comprises three 15-ton locomotives, 250 S-D "Automatic" Drop Bottom Cars and a 450-ton capacity Surge Bin. Coal and slate cars are often mixed in the same trip of about 20 cars. An average haul from the mine to Surge Bin is about 3 miles.

DETAIL INFORMATION ON THE S-D HAULAGE SYSTEM AT RED JACKET'S NO. 17 MINE

NO. OF S-D "AUTOMATIC" DROP BOTTOM CARS:
200 16 foot (6 ton capacity) cars for transporting coal.
50 12 foot (4 ton capacity) cars for transporting slate.

Car Wheels: S-D "Floater" Ball Bearing

Method of Loading Cars: Mobile Loaders to Shuttle Cars to Elevating Conveyors to S-D "Automatics".

Average Trip: 20 cars.
Average Haul: 3 miles.
Track Gauge: 48 inches.

SURGE BIN CAPACITY: 450 tons
Construction: Concrete
Bin Length: 52 feet
Bin Width: 25 feet
Tracks Over Bin: Two (Bin loaded by trips entering from either direction).

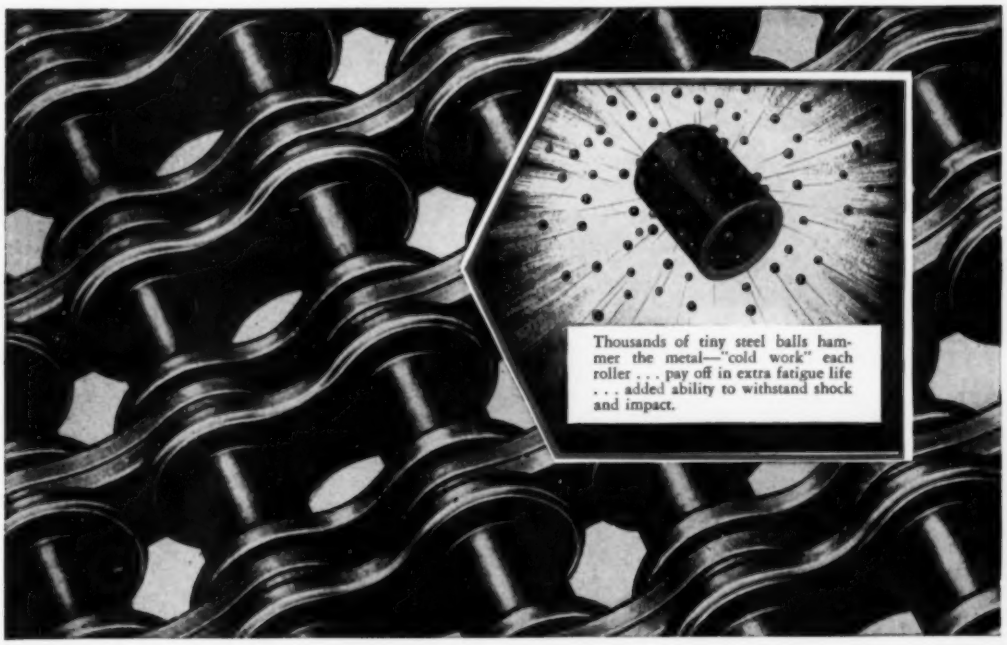
COAL HANDLED BY THE 250 S-D "AUTOMATICS" AND 450 TON CAPACITY SURGE BIN: 4,000 tons per day

As each trip approaches the Surge Bin, the slate cars are independently emptied at a slate bin. Trip continues non-stop over Surge Bin where coal cars are automatically emptied, then returns back to the mine. This fast, dumping-on-the-move haulage operation saves hundreds of man-hours by eliminating manual dumping. It saves thousands of dollars involved in maintaining expensive rotary dump equipment. It saves hundreds of hours in down-time because, in the S-D System, should a breakdown occur it is not necessary to shut down the whole system until repair is made. In addition, this system reduces mining and cleaning plant operation costs because it permits each to operate independently of the other. One shift operation of preparation plant is often sufficient to take care of two shift operation of mine. Any cleaning plant works at the least cost with an even continuous supply of coal. The Surge Bin continues to supply coal to preparation plant when, for any cause, there is a delay at the face. Breakdowns or delays at the preparation plant need not stop mine production because the Surge Bin will take the coal until repairs are made.

This continuous supply of coal from the face to the preparation plant, guaranteed by the S-D Haulage System, is absolutely necessary to produce coal at the lowest possible cost. This system is recognized as the leading method of cutting coal mining costs today! We welcome an inquiry from you. Sanford-Day Iron Works, Inc., Knoxville Tennessee.

SANFORD-DAY IRON WORKS

Get the roller chain that gives you SHOT-PEENED rollers...


Thousands of tiny steel balls hammer the metal—"cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

look for the darkened rollers!

THERE are sound reasons for the universal acceptance of Link-Belt Precision Steel Roller Chain. Two of them—shot-peened rollers and Lock-type Bushings—are shown here.

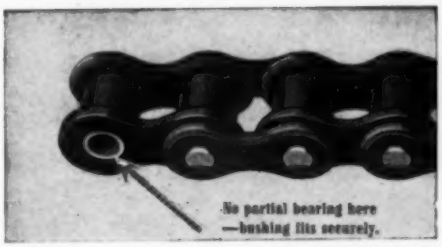
Others include Link-Belt's rigid material selection and controlled heat treating—your assurance of absolute uniformity with no weak members.

Whether it's for drive or conveyor service, you can get the best in roller chain from the complete Link-Belt line—single and multiple widths, in ⅜″ through 3″, and double pitch, 1″ through 3″. Next time you need roller chain, call the Link-Belt office near you.

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in Principal Cities. 12,097



Lock-type Bushings increase ability to withstand shock loads

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1″ pitch and double pitch roller chains through 2″ pitch.

LONE STAR STEEL

It takes Tournadozer only 45 minutes to clean around 4 draglines and a shovel over a 1.3 mile distance.

With forward speeds up to 35 m.p.h., Tournadozer moves clean-up runs rapidly and economically. 8 m.p.h. reverse speeds and constant-mesh transmission help provide double crawler production on short and intermediate runs.

After 3000 hours work in highly abrasive materials, substantial part of original tread still remains on Tournadozer's 21.00 x 25 low-pressure tires. After further use, these tires will be re-treaded for additional mileage.

LETOURNEAU EQUIPMENT

R. G. LeTOURNEAU, INC.,

PEORIA, ILLINOIS

replaces 3 crawlers with 1 Tournadozer

"Very fine for clean-up work," says Supt. W.L.KENDRICK

Texas' largest pig iron producer, the Lone Star Steel Co. of Dallas, has greatly simplified and speeded clean-up operations at their Daingerfield open pit mine by replacing three 144 h.p. crawler tractors with 1 high-speed rubber-tired 186 h.p. C Tournadozer.

The 19 m.p.h. Tournadozer regularly serves 3 to 5 draglines and shovels . . . while, previously, each crawler could clean up around only 1 or, at the most, 2 excavators. In addition, Tournadozer handles a lot of widely-scattered dozing jobs . . . is literally all over the mine, 16 hours a day, 6 days a week, helping keep daily ore production at scheduled 15,000 tons. As W. L. Kendrick, Lone Star's division superintendent and a veteran of many years on the Mesabi Range and at Daingerfield, describes it:

"For our work, where speed, mobility and power are essential, Tournadozer has proved *very* satisfactory. It's a fine machine for cleaning up around shovels, pushing trucks in soft footing, and doing miscellaneous dozing. We are very pleased with its performance."

These "miscellaneous" tasks at present include: blading and cleaning haul roads . . . dozing overburden . . . cutting ramps from haul roads to loading areas . . . preparing dragline sites . . . and hauling equipment. Material ranges from rock and heavy limonite ore (weighing over 4,100 lbs. per cu. yd.) to sand, clay, and even gumbo. Tournadozer does particularly well in pushing trucks through soft going, because its speed and the smooth control of its instant-shift transmission keep it pushing steadily against truck as footing improves and haul speed increases.

3000 hours, 90% efficiency, tires still good

With 3000 hours of rugged service on these tough, high-speed assignments, Tournadozer has given over 90% efficiency. Despite the abrasive, rocky materials, the "C's" 21.00 x 25 low-pressure tires *still carry a substantial part of their original tread* (see photos). After additional wear, the tires will be re-treaded.

This is just one of a series of world-wide jobs where rubber tires, *rolling on dirt*, sand, rock and ore, are proving far more productive and economical than tracks *wearing in dirt*. See your LeTourneau Distributor for all the facts . . . let him demonstrate to you that frequent and costly track repairs can be eliminated. Let him show you how Tournadozer's 19 m.p.h. speeds, its simple steering controls, and electric-controlled down-pressure blade will move more dirt at a lower cost.

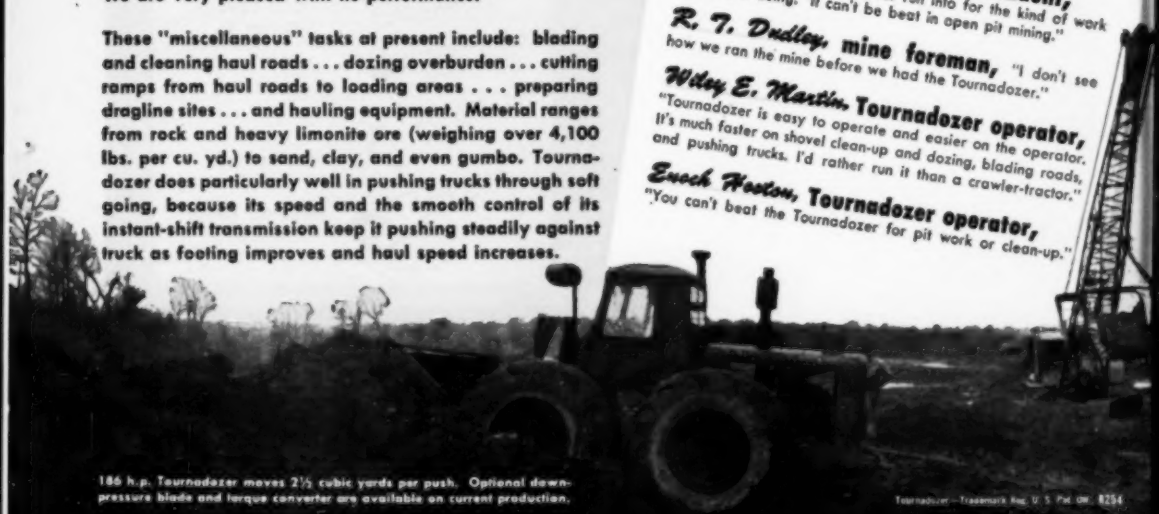
READ WHAT MEN WORKING THIS JOB SAY ABOUT TOURNADOZER

***M. J. Hughes*, mine superintendent,** "It's the best machine I've ever run into for the kind of work we have it doing. It can't be beat in open pit mining."

***R. T. Dudley*, mine foreman,** "I don't see how we ran the mine before we had the Tournadozer."

***Wiley E. Martin*, Tournadozer operator,** "Tournadozer is easy to operate and easier on the operator. It's much faster on shovel clean-up and dozing, blading roads, and pushing trucks. I'd rather run it than a crawler-tractor."

***Enoch Weston*, Tournadozer operator,** "You can't beat the Tournadozer for pit work or clean-up."



186 h.p. Tournadozer moves 2½ cubic yards per push. Optional down-pressure blade and torque converter are available on current production.

Tournadozer—Trademark Reg. U. S. Pat. Off. 8254

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

New
MEDIUM-DUTY UNDERCUTTER BIT
CC-2 COAL-CUTTER BIT
FINGER BIT
SOLID ROOF-BOLTING DRILL
IMPROVED AUGER DRILL BIT
Specify
CARBOLOY
THE QUALITY BRAND
OF COAL MINING TOOLS

Improved Auger Drill Bit

...mine-designed, mine-tested, mine-proved

Right from the mines comes the advanced design of this new, AD-30, 1⅞", dual-purpose, Improved Auger Drill Bit for blast-hole drilling and starter drilling for roof bolting.

Feeding pulverized coal more rapidly into the auger steel *without coal packing—even at the new high drilling speeds which are now possible*—is an outstanding *tested* and *proved* result of the mine-developed design of this new, Improved Auger Drill Bit.

And as another example in the Carboloy continuing program of advanced and improved design, the carbide tip contour has been altered and the entire shank heat-treated for additional strength in penetrating rock strata encountered in roof-bolting work.

Carboloy Tools Help Cut Downtime

You can lower costs in every phase of coal cutting by standardizing on Carboloy Coal Mining Tools. And downtime is reduced all along the line when your miners are backed up by the *seven vital advantages* of carbide tools:

1. They cut more coal per shift than any others under equal conditions. **2.** Stay sharper far longer between grinds, eliminating a great per cent of the time wasted in bit changing . . . keeping costly machinery working more of the time . . . reducing equipment and labor costs per ton . . . boosting production per man. **3.** Provide longest possible tool life. **4.** Take more regrinds per tool. **5.** They are more efficient, require less power. **6.** Make clean, shattering cuts, with less wear and tear on vital machinery. **7.** Require far less conditioning . . . are back at work quicker.

Technical Services Help Cut Over-all Costs

To make sure you get *all* the benefits built into Carboloy Coal Mining Tools, take advantage of these helpful, valuable Carboloy services:

1. Complete training course for your key personnel. It features instruction and demonstration in correct grinding practices, and special discussion with your men on cemented carbide use in relation to the most efficient carbide coal-mining practices under your specific setup.

2. The assistance and advice of qualified Carboloy Field Engineers and your local Carboloy distributor.

3. Plus clear, concise maintenance-instruction manual and catalog—No. CM-100E.

Check today with your nearest Carboloy distributor, or write us direct for catalog (CM-100E) and additional tool or service information.

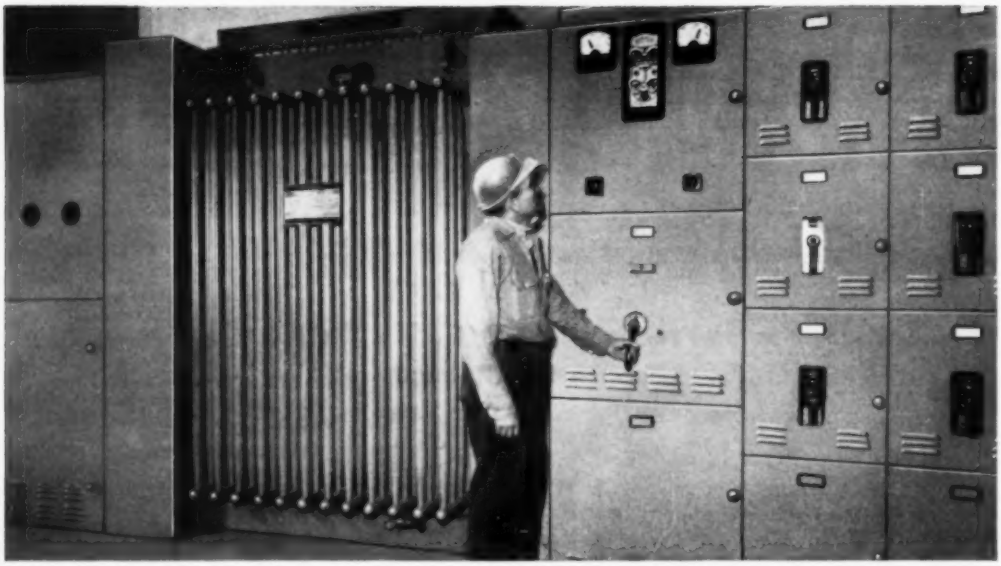
"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

11120 East 8 Mile St., Detroit 32, Michigan

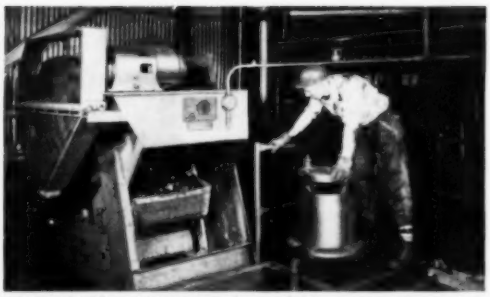
PLANTS AT DETROIT, MICHIGAN; EDMORE, MICHIGAN; AND SCHENECTADY, NEW YORK



G-E LOAD-CENTER UNIT SUBSTATIONS, co-ordinated into a load-center distribution system by skilled G-E application engineers, provide an easy way of supplying power at the right voltage where it's needed, for greater efficiency.

G-E system engineering helps

G-E GROUPED CONTROL centralizes control of various sets of motors. Interlocks and timers permit sequence operation.



G-E TRI-CLAD® GEAR MOTOR (shown driving a secondary refuse elevator) requires little more space than standard motor.

G-E TOTALLY ENCLOSED FAN-COOLED MOTOR (shown driving conveyor) is protected against damage from coal dust.

®*Registered trade-mark of General Electric Co.*

G-E METAL-CLAD SWITCHGEAR, incorporated in this plant power system, contains incoming line and feeder breakers selected to assure adequate interrupting capacity. Units are shipped assembled to save installation time and cost.

keep clean-coal output high

G-E application engineers can help plan your electrical system to speed startups, cut power costs, assure production continuity

G-E MASTER CONSOLE DESKS—the heart of the control system—centralize all pushbutton stations and indicating lights in one convenient location.

General Electric application engineers can serve you most effectively while you're still in the planning stage. Familiar with your industry's needs, they work closely with your engineers. Together, these skilled technicians select the right G-E electric equipment that will best match the rated capacity of your plant.

Moreover, this equipment is co-ordinated into a complete, reliable electrical system. It will be responsible, to an important degree, for keeping your plant equipment on the job . . . for boosting power factor and lowering power costs . . . for reducing manpower requirements through automatic control.

Call in G-E application engineers early—when you first start planning. That way, you'll be assured of a more efficient electrical system. *General Electric Co., Schenectady 5, N. Y.*

663-24

Engineered electrical systems for coal preparation plants

GENERAL ELECTRIC

IT'S NO TRICK TO RE-ORDER BOWDIL BITS..

1. PLACE YOUR TYPE BIT ON THESE ACTUAL SIZE LINE DRAWINGS.

2. IT'S EASY THEN TO ORDER BY NUMBER.

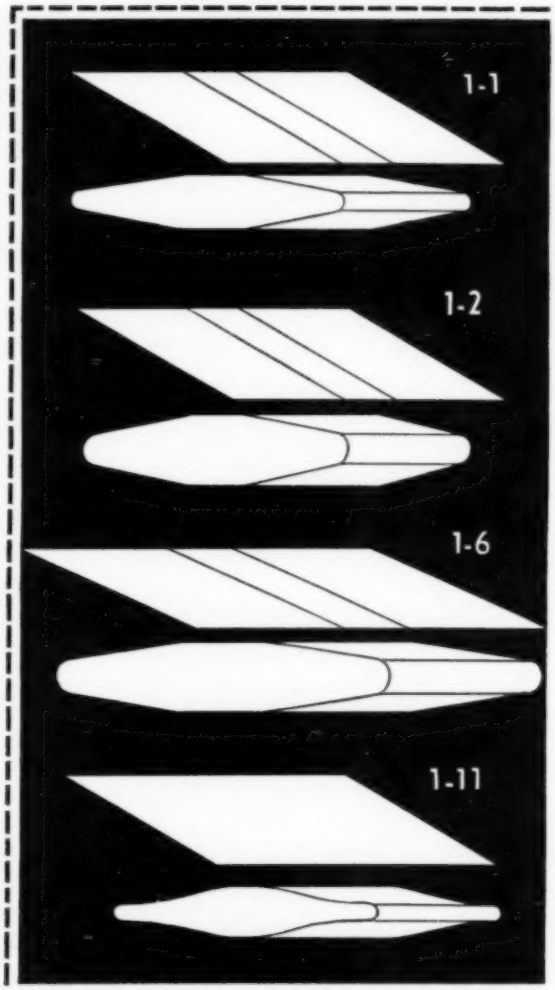
Designed especially for specific coal cutting requirements, made from special alloy steel, heat treated to a variety of hardnesses, these bits are available in special shapes, contours of the cutting face, and clearance angles. Bowdil Bits are the result of many years of research on actual cutting conditions in the field by the Bowdil Company.

► The **1-1 DIAMOND BIT,** designed for use where the cutting conditions are not too severe, saves power and produces larger slack.

► The **1-2 DIAMOND BIT,** designed along the same lines as the 1-1, is especially adapted for severe cutting (Iron Pyrites and Rock).

► The **1-6 LONGWALL BIT** is especially designed with a long cutting point for Longwall work.

► The **1-11 CONCAVE BIT** is designed for even greater power savings. This bit has a narrow cutting face and special side clearance which becomes greater as the cutting point wears away. The result is a more uniform power consumption over the full life of the Bit.



COUNT ON LOWER OPERATING COSTS WITH BOWDIL FABRI-FORGED CHAIN

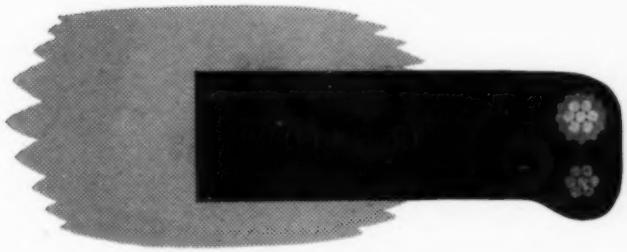
This Bowdil design is rugged and easy to maintain. Drop-forged lug body stands up under heavy wear, breakage practically eliminated. A major improvement is the true-running radial track guide.

DESIGNED FOR EXTRA STRENGTH AND POWER SAVING . . . BOWDIL CUTTER BARS

have rivet-free bodies, z bar construction and wide wearing strips . . . the sturdiest bar in mining. Bowdil Cutter Bars are standardized to fit all coal cutting machines.

The BOWDIL COMPANY ~ CANTON, OHIO

REPEAT ORDERS CONFIRM POPULARITY OF TIREX SHUTTLE CAR CABLE



Simplex-TIREX Shuttle Car Cable with the unusual "geared" design is barely more than two years old, yet it has already achieved widespread popularity.

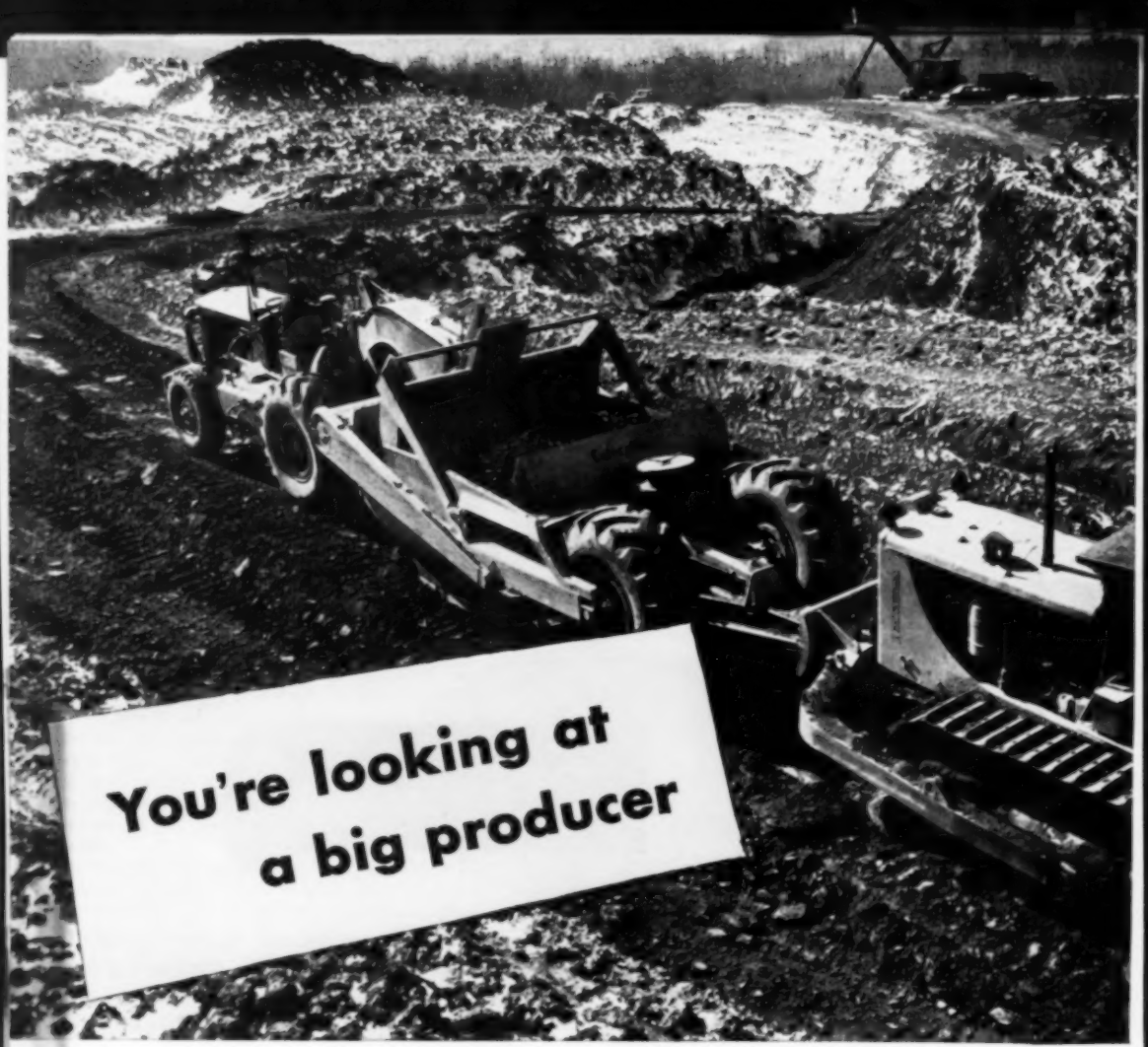
The reason for this unusual popularity is not dificult to find. It is told in repeat orders and in letters from enthusiastic customers. Repeat orders, of themselves, are the finest testimonial any product can receive.

The letters explain why customers are buying Simplex-TIREX Shuttle Car Cable to the exclusion of all other types for shuttle car and mining machine service. The reasons given are many and varied but they all add up to the same conclusion. TIREX Shuttle Car Cable gives longer life under more rugged conditions and will haul more tons of coal per dollar of cable cost. That's a darn good reason for anybody to buy a product.

Have you tried Simplex-TIREX Shuttle Car and Mining Machine Cable yet for your "buggies"? If you haven't, you can get it from your mine supply house.

Simplex - WIRES & CABLES

SIMPLEX WIRE & CABLE CO.
79 SIDNEY STREET,
CAMBRIDGE 39, MASS.



Here's a rig that combines speed, stamina and capacity for high production—a "Caterpillar" DW20 Tractor with No. 20 Scraper. This balanced team is working in M. H. Bigan's strip mine near Altoona, Pa. Stripping overburden that averages 65 feet in depth, the rig comes up with production that ranges between 1,200 and 1,500 tons per 7-hour day. You can see what the going is like.

In more detail, here's how the operation shapes up. After being push-loaded by a D8, the DW20-No. 20 unit hurries off on a ¾-mile haul with an average load of 16 tons. It spreads the overburden evenly—a maneuver that reduces backfilling time. It also fills in pockets left by the shovels—another time- and money-saving maneuver.

Everything about the "Cat" DW20-No. 20 team is designed for profitable performance. Travel speed of 26.6 m.p.h. Capacity of 20 cu. yds. heaped and 15 cu. yds. struck. High apron lift for fast ejection of heaped, sticky materials. Reinforced double bottom for exceptional strength. These are just a few of many features that make the rig pay off for you.

Get the *complete* picture from your "Caterpillar" Dealer. He's as close as your phone for service or information—call him today!

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

① MORE THAN 150 JCM UNITS NOW BUILT OR BUILDING

Here's the best-of-all evidence of the sound, practical design and field-proved worth of JOY Continuous Miners. As of midsummer, 1952, over 150 JCM units are either on the job or soon will be . . . slashing costs-per-ton and boosting tonnage-per-man-hour from coast to coast across the United States, in Canada, and in a number of foreign countries from England to Australia.

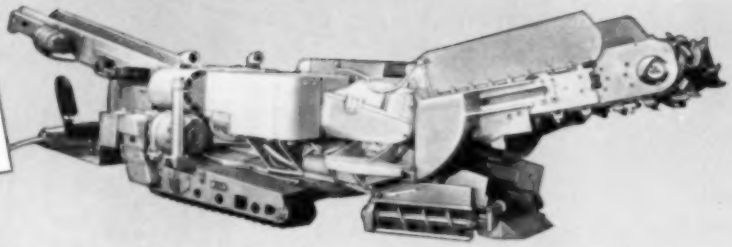
The ratio of low to high-seam machines runs about three to two. JOY Continuous Miners are operating in every important bituminous coal seam in the country. And that's not all—they're also proving their great economic value in non-coal mining. A number of JCM units are giving excellent results in borax mining in Colorado, and two other groups are working profitably in potash mines in the Southwest and in France.

But the bulk of Continuous Miners are in coal, and on the following pages are some of their performance records and advantages . . . a few of the reasons why JCM machines represent the last word today in efficient mechanized mining.

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

PROGRESS REPORT
ON JOY
CONTINUOUS
MINING



2 FAVORABLE SIZE CONSISTS

MINE "A"

This is a Western Pennsylvania mine, operating in a 40" to 46" seam considered fairly clean—no noticeable slate or sulphur binders, but numerous bottom rolls and clay veins. Normally good roof and firm bottom. No roof-bolting done at the active faces. Five low-seam Continuous Miners in service here (the company operates six more in two other mines). The machines develop entries and drive rooms; no pillaring is done. They use a four-man crew, and average 130 tons per machine per shift. Shuttle cars deliver the coal direct to belt conveyor main haulage. Following is a typical screen analysis:

Over 6"	2.8%
6" x 3"	4.2%
3" x 1½"	7.0%
1½" x ¾"	14.0%
¾" x ⅜"	17.0%

45.0% over ⅜"

41.4%—⅜" x 28M

MINE "B"

This mine is located in Southern West Virginia, working in coal approximately 52" high with a good top and fair bottom. The coal itself is fairly firm, but has some sulphur balls. They drive headings and work both rooms and pillars, using an average five-man crew on a Continuous Miner and averaging 450 to 500 tons per machine in two shifts, day and night, with a bit cost of approximately 10¢ per ton. The coal is loaded into 6-SC Shuttle Cars, then directly from the cars on a 30" belt and taken outside by an all-belt haulage system. A typical sizing analysis follows:

Over 2"	13.29%
2" x 1"	8.06%
1" x ¾"	5.06%
¾" x ½"	8.53%
½" x 5/16"	12.52%

47.5% over 5/16"

45.6%—5/16" x 28M

MINE "C"

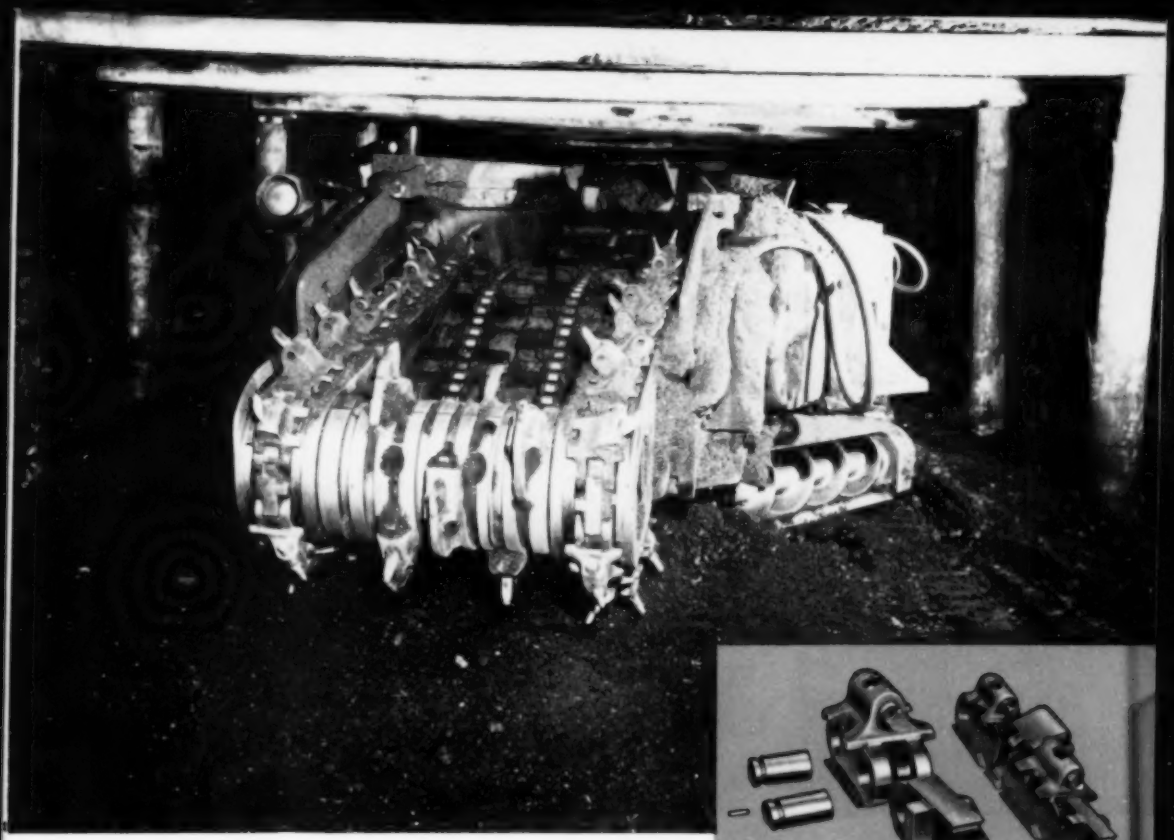
This mine is in Alabama, working a seam of 54" average section. There is 30" of gray shale overlaying the coal, topped by sandstone. The bottom is fireclay. Haulage ways are roof-bolted, with temporary beams and jacks used in rooms. Six 3-JCM Continuous Miners are in use. Production per day from these six low-seam units, operating double shift, is 3850 tons of raw coal, which averages 46 tons per man for each section crew. Haulage team is 6-SC Shuttle Cars and belt conveyors, with 12-BU Loaders delivering coal to the shuttle cars. The following size consist is a composite of samples:

Over 6"	3.75%
6" x 3"	7.51%
3" x 1½"	8.04%
1½" x ¾"	20.62%
¾" x ⅜"	23.13%

63.05% over ⅜"

28.8%—⅜" x 28M

Left below: *Action shot of coal coming off the tail conveyor boom of a Continuous Miner into a shuttle car.* **Right:** *Here a 12-BU Loader is delivering coal from the Miner to shuttle cars.*



Driving chain for the Rotary Head Continuous Miner . . . rugged and simple, developed specifically for its purpose —not a modification or makeshift.

Heavy duty Sulmet Bits used in the Rotary Head, designed both for maximum life and improved size consists, reducing the yield of coal in the smaller sizes.

3 ROTARY DRUM HEAD HAS MANY ADVANTAGES

Rugged Construction–Low Maintenance

The rotary drum type of ripper head currently supplied on all Continuous Miners is a typical on-the-job JOY development, simplified in design and vastly improved in performance. It is rugged and compact, employing special alloy materials where required to assure operators of uninterrupted service with the least possible "down" time and consequent loss of production, and the maximum reduction in maintenance time and cost.

Reduced Power Consumption

Actual performance records from the many Continuous Miners with rotary drum heads operating in the field show that power requirements for the machine are reduced from 20 to 30% with this type of head. This is an important saving in itself, but in addition, there is less load throughout the drive, transmission and control units, resulting in other major improvements in overall machine performance and in maintenance and repair costs as well.

Longer Bit Life – Lower Cost

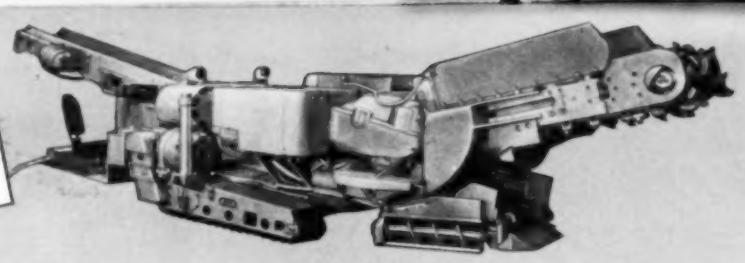
All the advantages of the rotary drum head have been secured without any sacrifice of tonnage. However, the yield of coal in sizes above 1" has been increased 50% or more, with an accompanying reduction of 20 to 25% in the sizes below ½". And not only has the number of bits used in the rotary head been reduced to about half those used in the original 6-chain cutter head, but bit life has been increased two or threefold. Overall head maintenance with the Joy Rotary Drum design has actually been reduced 40 to 50%.

JOY

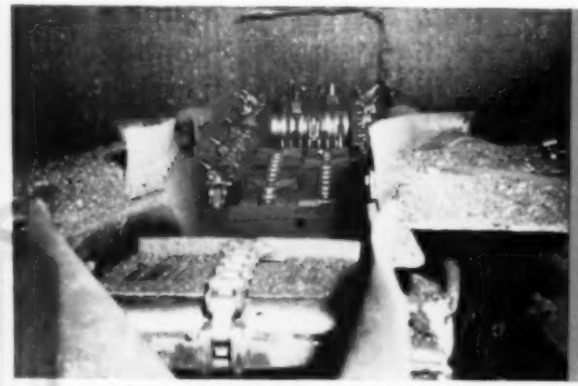
WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL 4264

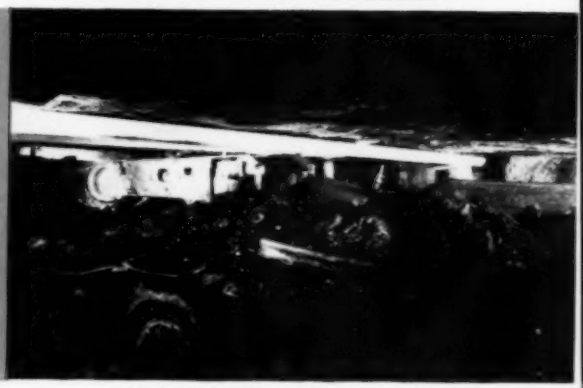
PROGRESS REPORT
ON **JOY**
CONTINUOUS
MINING



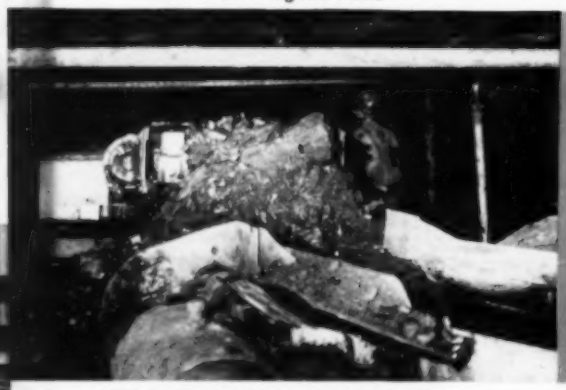
④ JCM UNITS ARE *Versatile*



DEVELOPING ENTRIES
in a West Virginia Mine



DRIVING HEADINGS
in a Pennsylvania Mine



WORKING ROOMS
in an Alabama Mine

TAKING PILLAR
in an Illinois Mine

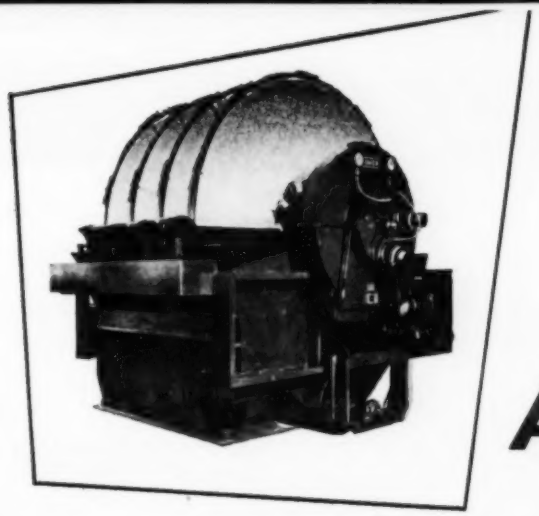
JOY Continuous Miners are flexible, highly efficient machines wherever you put them . . . in any mine they can enter, and in thin seams, thick seams or split seams . . . driving entries and rooms and taking pillar, showing total coal recoveries of well over 90% in many cases. JCM units are supplied in two models and four heights from 34" to 53¼", for mining from 6" below to 98½" above bottom as regularly equipped, and up to 120" above bottom with special equipment. ● Let us give you full details. *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

WBD CL-4200

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT



EIMCO AGIDISC

CONVERT COAL FINES INTO PROFITS

Fine Coal can be saved at a profit when an EIMCO Agidisc Filter is included in the flow sheet. When thickened coal fines are fed to the Agidisc, moisture will be reduced to approximately 15% and cake can be mixed with other products from the plant.

EIMCO Agdisc filters are available in production sizes from 4' to 12'6" diameter with from 1 to 12 discs per unit. Filter area ranges from 22 to 2400 square feet.

Write for more information on EIMCO Agidisc Filters.

EIMCO A384

THE EIMCO CORPORATION

The Leader in the Manufacture of Vacuum Filtration Equipment

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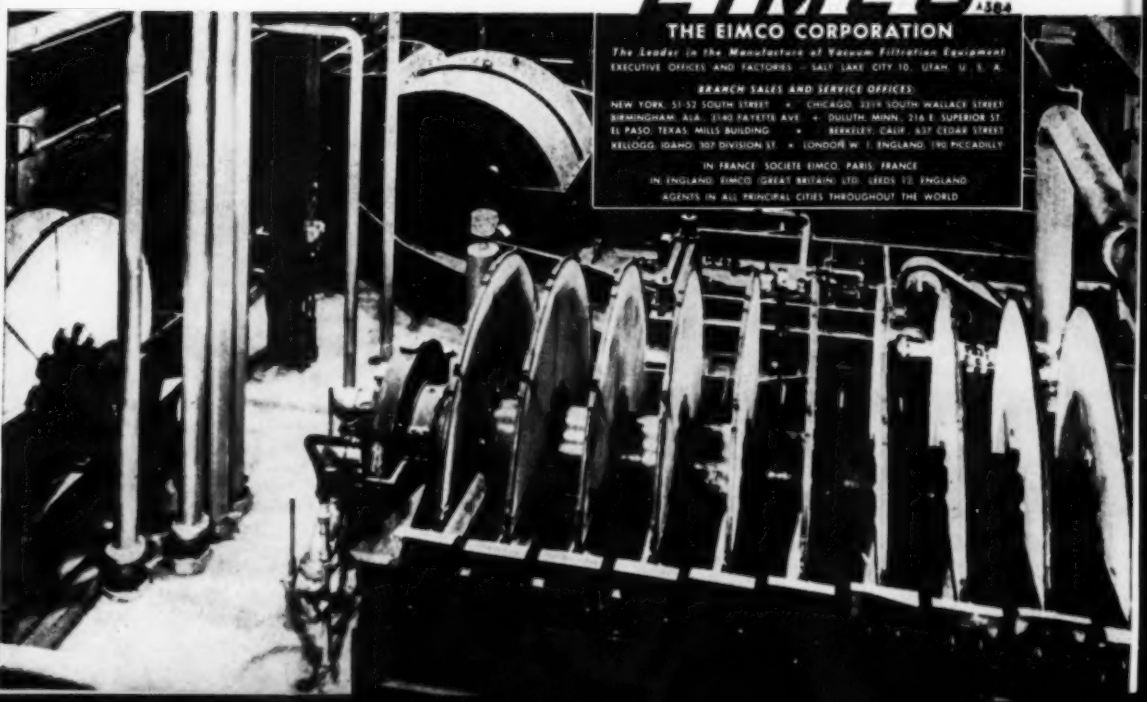
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD



Let's Call Wire Rope Constructions *by their Right Names!*

This is a message of importance to every user and purchaser of wire rope. It is information that will help eliminate much of the past confusion over wire rope terminology.

How did this confusion arise? Let's illustrate briefly. For years 6 x 19 has been just a name for a variety of six-strand ropes, few of which actually have 19 wires per strand. As an example, our popular 6 x 19 W has always contained 25 wires per strand; the 6 x 19 U, 21 wires per strand. The 6 x 19 Seale, on the other hand, really does have 19 wires in each of its strands. Until recently, the letter or name following the numbers denoted the actual construction; but many users did not know this, and the omission of these symbols occasionally resulted in costly misapplications.

To clarify matters in the various classes of rope, Bethlehem has revised the entire list of misleading designations. For instance, in the Bethlehem terminology, Type W rope is now designated—accurately—as 6 x 25 W (not 6 x 19); Type Q is 6 x 41 Q (not 6 x 37). This completely accurate terminology applies to each and every rope that Bethlehem makes.

Nothing has been changed but the designation. The ropes are made to the same high standards of Bethlehem quality. *Constructions are the same as in the past.* Only the names, the designations, are different. The numbers now mean what they say.

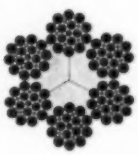
We earnestly solicit your help in publicizing this information. The transition now under way is one that has long been needed.

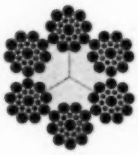
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

6 x 25 Type W	6 x 21 Type U	6 x 19 Seale

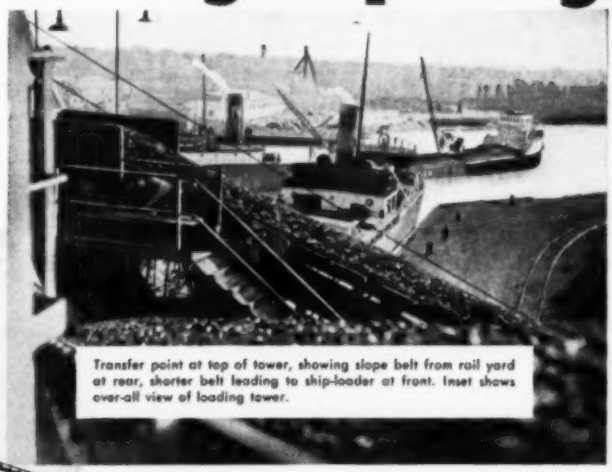




Of these three ropes, Seale is the only one with 19 wires a strand. Yet for years all three types have been known as 6 x 19. This is not an isolated case. Similar instances occur in other classifications of rope.

Tripled Handling Capacity

—without changing equipment!



Transfer point at top of tower, showing slope belt from rail yard at rear, shorter belt leading to ship-loader at front. Inset shows over-all view of loading tower.

THIS coal-handling system — used to transfer coal from cars to Great Lakes shipping—originally handled 620-750 tph of coal. It was belted by the G.T.M.—Goodyear Technical Man — with 6-ply Style B Goodyear Conveyor Belts.

Today, *without changing equipment in any way* except increasing belt speed, this system is handling 2,100 tons per hour—has handled as much as 32,000 tons per day and a five-year total of over 7,000,000 tons of coal!

The belts have been able to do this for two reasons — Goodyear job-designed belt construction, and good maintenance at all times by the operators of the facility.

LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

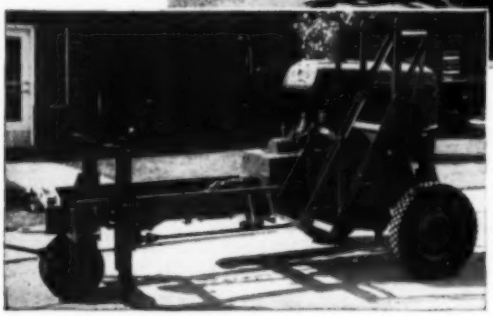
GOODYEAR

THE GREATEST NAME IN RUBBER

PARMANCO HI-SPEED HORIZONTAL DRILL

Completely Re-designed Around a 40 H.P. Engine

Drills a 6-inch Hole in two-thirds the ordinary time

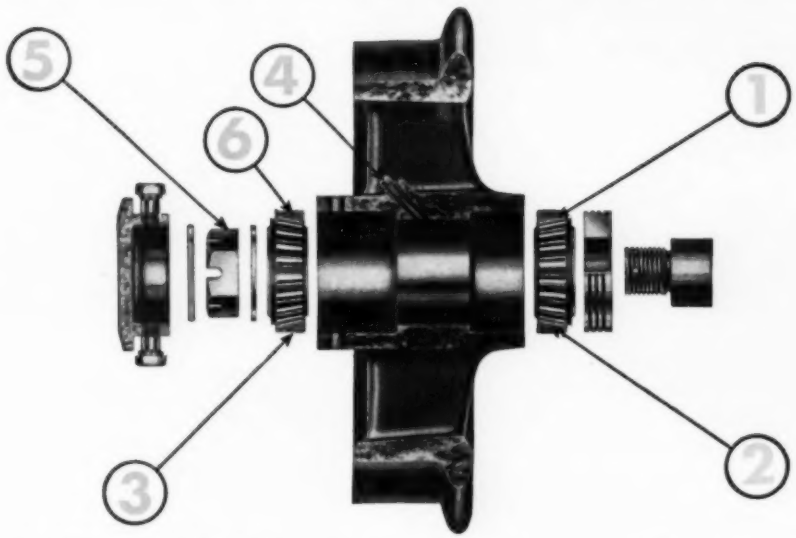


Included in the new design is an auger rack which saves on drilling time. The augers are on the machine as it is moved from hole to hole. Another feature, for faster set up and smoother drilling, is the four individually adjustable leveling jacks. Automotive steering is optional.

This HI-SPEED DRILL is designed for drilling 5-6-8 in. holes to 100 ft. or more. The 40 h.p. engine with four drilling speeds makes possible the reduction of footage time by one third. This new drill, the very latest in design, is equipped with self starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

PARIS MANUFACTURING CO. PARIS ILLINOIS

LOOKING FOR A WAY TO CUT HAULING COSTS?



TIMKEN® bearings cut costs 6 ways

Check these cost-cutting advantages and you'll see why over 500,000 mine cars are now rolling on Timken® bearings.

1 GREATER RESISTANCE TO SHOCK LOADS. Timken bearings insure trouble-free mine car performance . . . eliminate costly time-outs for repairs. They stand up under the pounding a mine car gets because they're made of Timken fine alloy steel and case hardened to provide a hard, wear-resistant surface and a tough, shock-resistant core.

2 ADDED CAPACITY. Since loads are carried on a *line* of contact between rollers and races, Timken bearings have load-carrying capacity to spare.

3 EASY STARTING, LONGER TRAIN LENGTHS. True rolling motion plus smooth surface finish of rollers and races in Timken bearings practically eliminate friction. Trains start easily, more cars can be hauled.

4 SAVE ON LUBRICATION. Since Timken bearings keep housing and shaft concentric, they make closures more effective. Lubricant stays in, reducing maintenance—dirt and moisture stay out, reducing wear.

5 INSPECTION SIMPLIFIED. Timken bearings help simplify wheel mountings. They can be inspected by merely pulling the cap, cotter pin and nut.

6 NO NEED FOR SPECIAL THRUST PLATES. Timken bearings take radial and thrust loads in any combination because of their tapered construction. Cars take curves easier, require no special thrust plates.

Get these cost-saving advantages in your mine cars by specifying Timken tapered roller bearings. Look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

CUT YOUR COSTS BY SPECIFYING TIMKEN TAPERED ROLLER BEARINGS

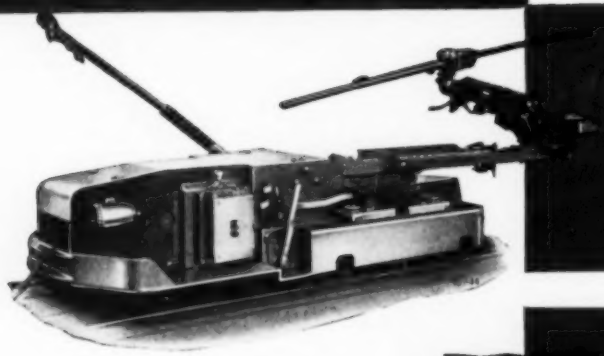
NOT JUST A BALL ○ NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

JEFFREY DRILLING MACHINES

FOR

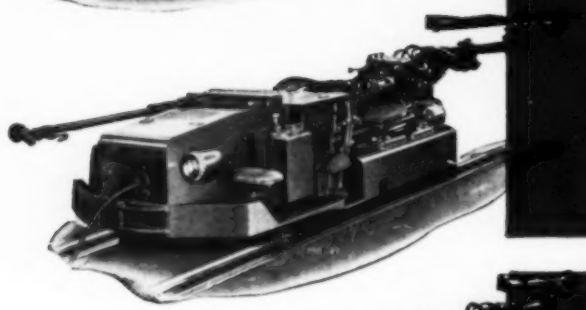
High Speed Drilling in Track or off-Track Mining

A TYPE AND SIZE TO MEET ANY REQUIREMENT

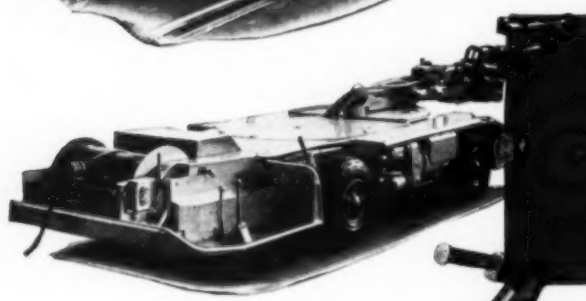


FOR TRACK OPERATION

55-A Track Type Drilling Machine, readily operated. Can be furnished with either one or two drill arms. Has self-propelling track drives by 15 H. P. motors with a running speed of 2½ to 5 m. p. h. Drill is equipped with 5 H. P. motor. Mast can be withdrawn by power when running direction of machine — leaving it cleared of all cutting.

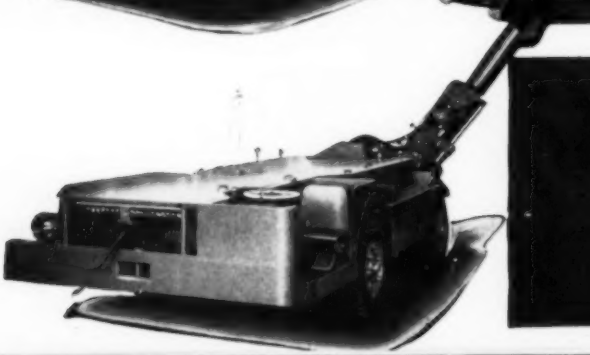


55-AH is an electrically and hydraulically operated track type machine — equipped with one drill arm only. Same general design as the 55-A labored except that hydraulic power is provided for operating the auger, swinging the drill end over, and for elevating the drill bar.



RUBBER TIRE MOUNTED MACHINES

55-RH is similar to the 55-H in both construction and operation. Tramming is accomplished by two hydraulic motors. Cable reel also hydraulically operated. Only one drill arm provided.



55-RH is also rubber tire mounted and is a heavy duty drilling machine—either one or two arms. Electric motor drives hydraulic pumps which provide power for tramming and driving the rotary mechanism on the operation of drill.

View above shows the Jeffrey 56-FHR Drilling Machine described on the opposite page (third one down). It is completely hydraulic in operation — will do a modern drilling job in trackless mines. Its many adjustments afford the utmost flexibility and permit proper placement of shot holes. There is a drill or drilling machine in the broad Jeffrey line to do your drilling job exactly. May we hear from you.

THE JEFFREY MANUFACTURING CO.

912 N. Fourth St. **Columbus 16, Ohio**

DISTRICT SALES OFFICES

BALTIMORE 2, MD. Munsey Bldg.
BECKLEY, W. VA. 403 City Ave.
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BOSTON 16, 38 Newbury Street
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CINCINNATI 2, Carew Tower
CLEVELAND 15, 1560 Hanna Bldg.
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DETROIT 13, 5808 St. Jean Avenue
FORTY FORT, PA. 166 Slocum St.
HARLAN, Kentucky
HOUSTON 2, TEX. City National Bank Bldg.
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JEFFREY MFG. CO., LTD., Montreal, Canada
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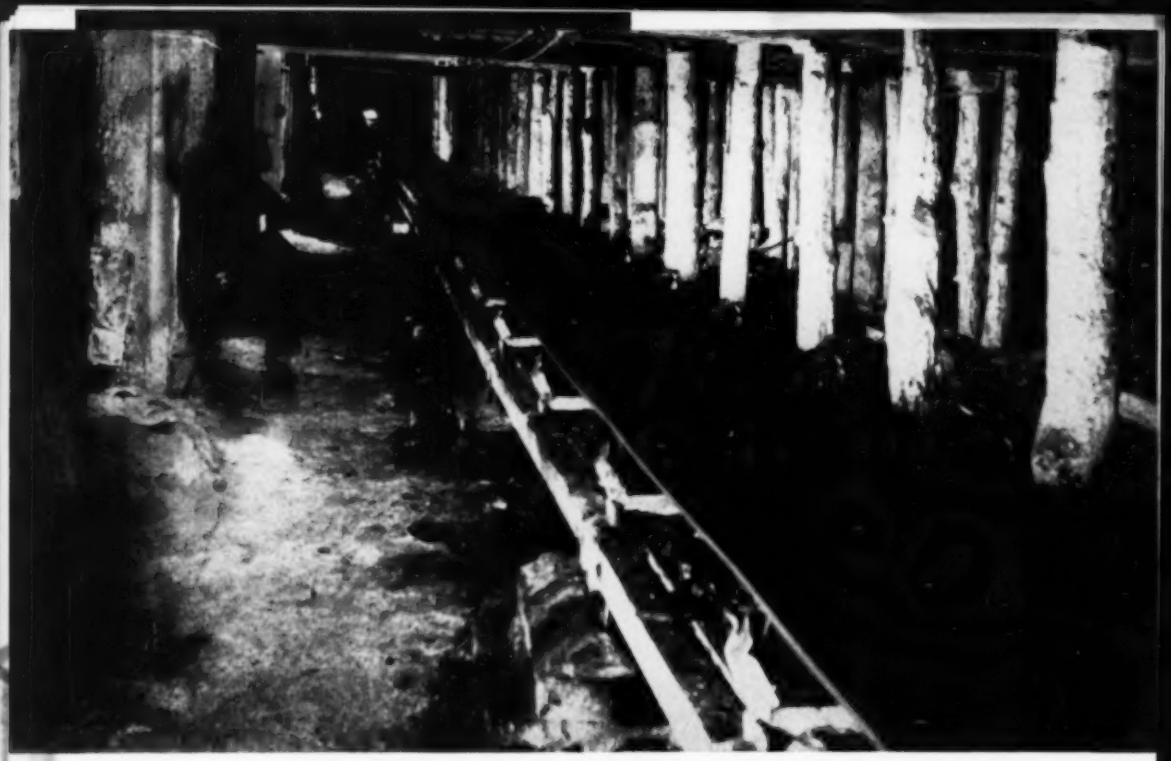
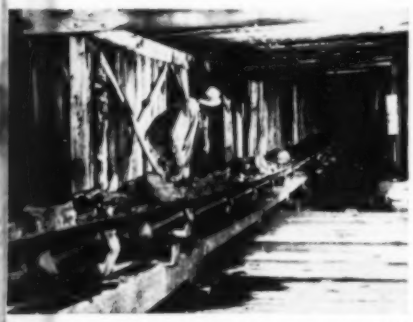
GALION (GREAT BRITAIN) LTD., Wakefield, England
THE KILBOURNE & JACOBS MFG. CO., Columbus, Ohio
BRITISH JEFFREY-DIAMOND, LTD., Wakefield, England

- Bin Valves
- Bucket Elevators
- Car Pullers
- Chains
- Conveyors (Chain or belt)
- Coal Cutters
- Continuous Mining Machines
- Crushers
- Drills
- Feeders
- Fans & Blowers
- Idlers (Belt)
- Jigs and Washers
- Loaders
- Locomotives
- Loading Booms
- Magnetic Separators
- Screens
- Shuttle Cars
- Transmission Machinery



At Warner Collieries' Betty Mine . . .

Belt reinforced with "Cordura" rayon trains perfectly . . . loaded or empty



STRONGER AND THINNER, this rayon-reinforced belt is 1,750 feet between centers. Driven by a 40-horsepower motor, it travels at a speed of 390 feet per minute.

CROSS BELT DUMPS LOAD on mother belt (as shown below). Despite this drop, the rugged "Cordura" reinforced belt has given trouble-free service during three years of use.

The picture above shows the mother belt in the Betty Mine, Warner Collieries, Mammoth, West Virginia, moving toward the mine entry unloaded. At left is a view of the same belt heavily loaded. According to Willard Smith, veteran operator, the belt trains perfectly whether loaded or empty. The 30" belt was manufactured by Goodyear Tire & Rubber Company of a 4-ply carcass of Du Pont Cordura* High Tenacity Rayon.

Belts reinforced with "Cordura" have greater strength, because "Cordura" rayon yarn is inherently stronger than natural fiber yarn. It is made of continuous strands with no loose ends to pull apart under stress. Stretch is reduced to a minimum. "Cordura" permits a thinner . . . yet stronger . . . belt, which is naturally more flexible, sits more snugly on the center idler, and thus trains better under any operating conditions.

Find out about conveyor belts made with "Cordura" yarn. We'll be glad to send you the names of suppliers . . . also give you full information about "Cordura" in the booklet "Sinews for Industry." Write for your FREE copy to: Textile Fibers Dept., Room 4421C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

HUBBARD MINE ROOF BOLTS

WEDGE-NUT STYLE

Easier to install...
More head room...
Greater safety...

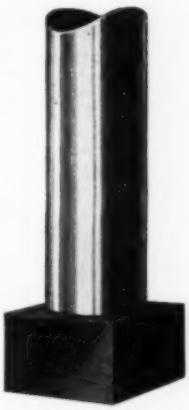
Exhaustive tests have proven that Hubbard Mine Roof Bolts meet all requirements for mines where roof bolting is practical.

The Hubbard Wedge-Nut Style Mine Roof Bolt is easily installed without the use of special equipment. The full square head, without chamfering, eliminates slipping of wrenches, saves time.

The only head room required for the Hubbard Mine Roof Bolt is the thickness of the bolt head plus the plate. Freedom of movement, for men and equipment, improves working conditions, increases output.

The design of the Hubbard Mine Roof Bolt is simple and fool proof. The wedge-nut consists of two diagonally separated sections. As the bolt is tightened the two sections move one against the other with a wedging action, spreading both parts against the walls of the hole. The wedge so formed takes a biting grip *over its entire length* that holds for keeps.

Hubbard Mine Roof Bolts are ¾-inch diameter. They are furnished in any desired length. Usual installation practice employs plate washers 6-inches or more square (not included). Write for additional details.



Patents Applied For

HUBBARD ROOF BOLT COMPANY

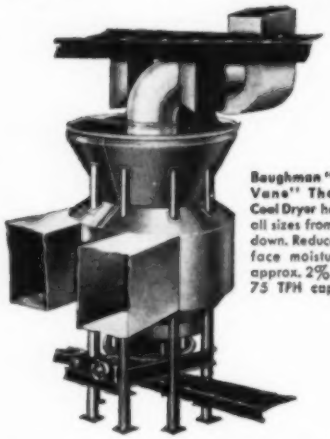
Hang the Load on Hubbard Headwork!

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

BEHIND THE NAME

HOLMES

IS 80 YEARS OF "*SPECIALIZED*" MANUFACTURING OF RELIABLE MINE EQUIPMENT

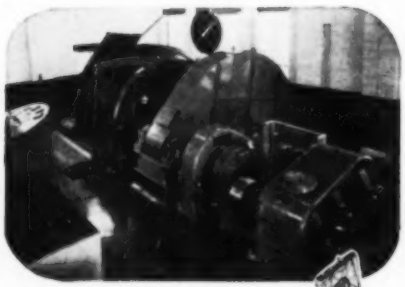


Baughman "Verti-Vane" Thermal Coal Dryer handles all sizes from 1¼" down. Reduces surface moisture to approx. 2%. 15 to 75 TPH capacity.

Increased mine production and efficiency—from the pit or shaft to the loading dock—are found today in hundreds of mines because of equipment pioneered by Holmes. Use this specialized experience to obtain the most advanced design, the best of materials and the latest methods of manufacture. Take advantage of this creative engineering and long-standing reputation for sturdy construction that assures efficient, dependable performance at a lower over-all cost. Call on a Holmes Mine Equipment Engineer for consultation in the planning and development of your requirements. There is no obligation.

ROBERT HOLMES & BROS., INC.
DANVILLE, ILLINOIS

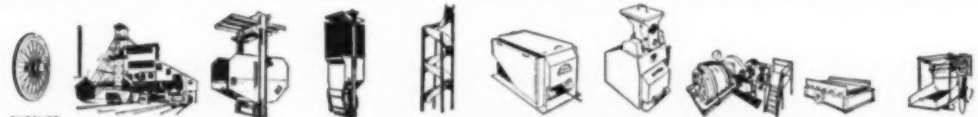
Dept. A-19



Holmes Advance Design Hoists feature the latest and most complete control equipment. Ask for complete information.

Ask for new Catalog Literature containing vital construction and installation information on The Baughman Verti-Vane dryer—Bulletin No. 101.

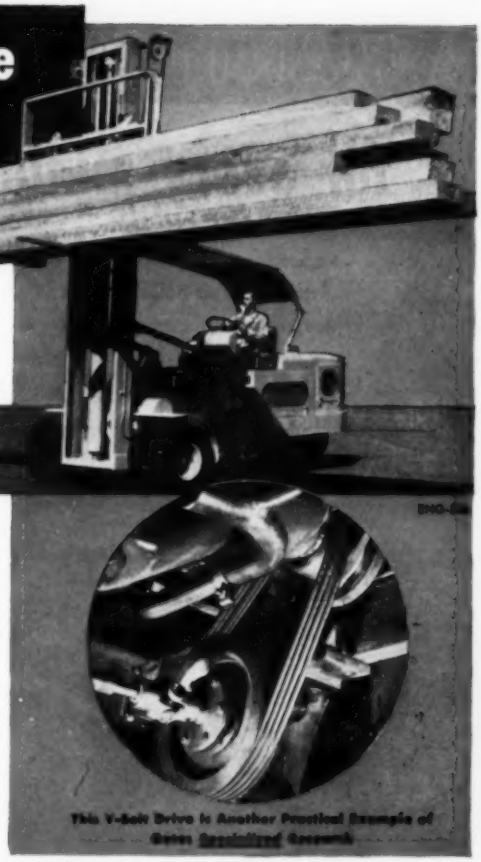
Peabody Coal Company's new mine No. 17 at Pana, Illinois, is equipped with Holmes Hoisting Equipment.



SHEAVES · TIPPLE EQUIPMENT · CAGES · SKIPS · LOWERING SPIRALS · CAR PULLERS AND RETARDERS · LABORATORY CRUSHERS · HOISTS · VIBRATING SCREENS · DUSTOLATORS

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Unique 4 Belt Drive Fits 2¼" Space



This V-Belt Drive is Another Practical Example of Gates Specialized Research

Transmits 34 h. p. to Operate Hydraulic Controls . . .

Unless they made costly changes, the Gerlinger Carrier Co., makers of big fork lift trucks, had only 2¼" on the crankshaft available for the hydraulic pump drive.

A standard V-Belt drive to carry a load up to 34 horsepower would have required 5½". It appeared that a chain drive was the only type that could handle the load and fit the space. Early trucks, therefore, were equipped with chain drives on the hydraulic pumps.

In service, however, chains gave trouble. It was impractical to encase them and their speed was so high (3000 ft./min.) that they threw off all lubricants, and wore out rapidly. Gates engineers were asked for a solution.

Drawing upon a background of more that 20 years of *Specialized* Research in V-Belt engineering, Gates engineers worked out a drive using four small specially designed V-Belts. This drive fits into the crowded space between engine and fan belt and yet has ample capacity to handle the heavy load.

V-Belt drive has many advantages

Unlike the chain drive, V-Belts require no lubrication, yet are quiet and positive and the multiple strands are an advantage because they assure uninterrupted operation. If one belt breaks, the others continue to carry the load until replacement can be made. A further advantage is that the early lift trucks can be equipped with the new drive at a minimum cost.

This is another example of the practical value of Gates engineering know-how applied to a critical design problem. Only rarely, of course, are special V-Belts required to solve such a problem, but the same engineering skill and experience is available to you—right in your own plant—for the solution of *any* power transmission problem you may have.

Phone for a Gates Field Engineer

Whenever you have a difficult drive to design—or if some difficulty develops on any drive in your plant or if you only want to know what V-Belts to use for the most efficient, lowest cost service on any particular drive—just pick up your phone book and call the number listed under "Gates Rubber."

A Gates field engineer will call on you and put at your service all the facilities of Gates *Specialized* Research on V-Belts—*without the slightest obligation.*

There are Gates engineering offices and jobber stocks in all industrial centers of the U.S. and 71 foreign countries.

The Gates Rubber Company • Denver, U.S.A.

®

The World's Largest Maker of V-Belts

Gates VULCO ROPE DRIVES

MANITOWOC

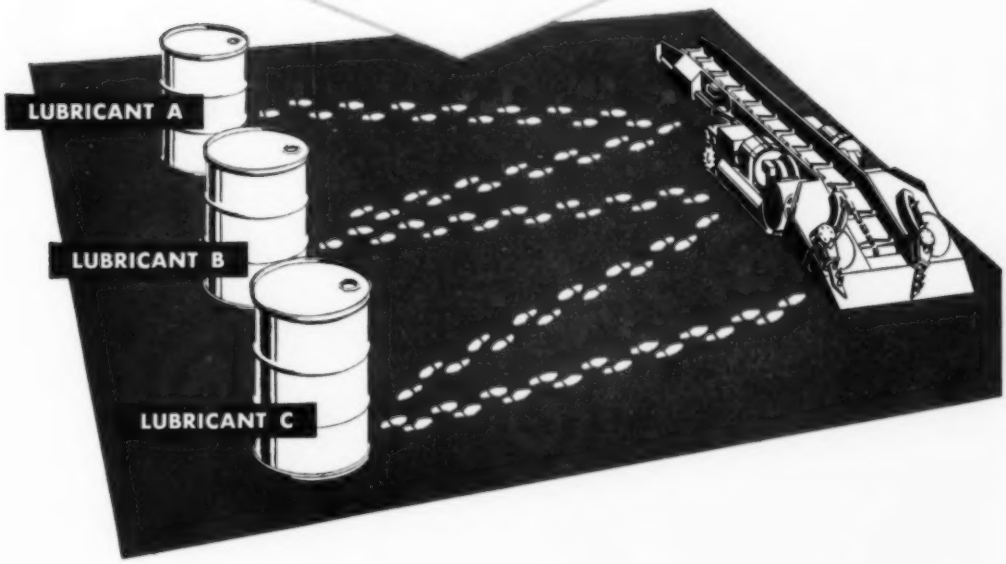
for every mining job

Excavating equipment is the key to lower mining costs . . . the big factor between profit and loss on an operation. That's why leading mine operators are selecting Manitowocs for stripping, excavating, loading and handling.

You'll find Manitowocs specially designed and built for mining . . . with big capacity and long reach . . . rugged, yet simple and easy to operate . . . big and powerful, yet extremely fast. And Manitowocs also give you the famous TORQUE CONVERTER drive . . . smooth, tenacious, shock proof, powerful . . . the most advanced power train in the industry.

Let us send you complete information. Before you invest in any excavating equipment, investigate Manitowoc. Manitowoc Engineering Works, Manitowoc, Wisconsin.

How much
are these extra steps
costing **YOU**?



GULF MINING MACHINE LUBRICANT
does the job of 2 or 3 other lubricants
—and does it better

Here's effective help in your efforts to reduce maintenance costs and simplify lubricant storage and handling —from oil house to face.

With Gulf Mining Machine Lubricant you eliminate confusion at the face, prevent application mistakes, and insure better protection for lubricated parts.

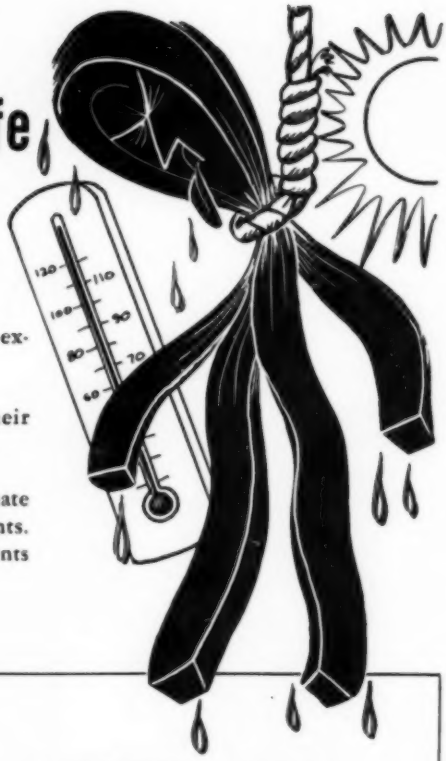
For additional information on this top quality product, write, wire, or phone your nearest Gulf office.

GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION
GULF REFINING COMPANY
Pittsburgh 30, Pa.

How to get More Life out of V-Belts

(STORAGE)



DON'T store V-Belts in a hot dry room or expose to the direct rays of the sun.

DON'T hang belts in such a way that their shape will be distorted.

DO specify and store *Bull Dog V-Belts* in adequate supply for your normal replacement requirements. With Bull Dogs on the job "normal" replacements are few and far between.

Your BWH distributor will be glad to show you how Bull Dog V-Belts have the covers, the cords and the compounds to cut *your* belting costs. Call him today.

HERE'S WHY

Their DURABLE COVERS withstand the severe wearing action of the sheave while sealing the belt against grease, dirt, moisture.

There's MINIMUM STRETCH due to a new, exclusive technique which results in fewer takeup adjustments, reduced slippage, longer belt life.

There's a STRONG, SPECIALLY ENGINEERED CORD SECTION with high tensile strength, increased load carrying capacity, ability to absorb shock loads.

The belt TAKES HEAVIEST FLEXING because BWH quality-controlled compounds run cooler and do not crack or deteriorate under severe flexing.

BWH
DEPENDABLE RUGGEDNESS

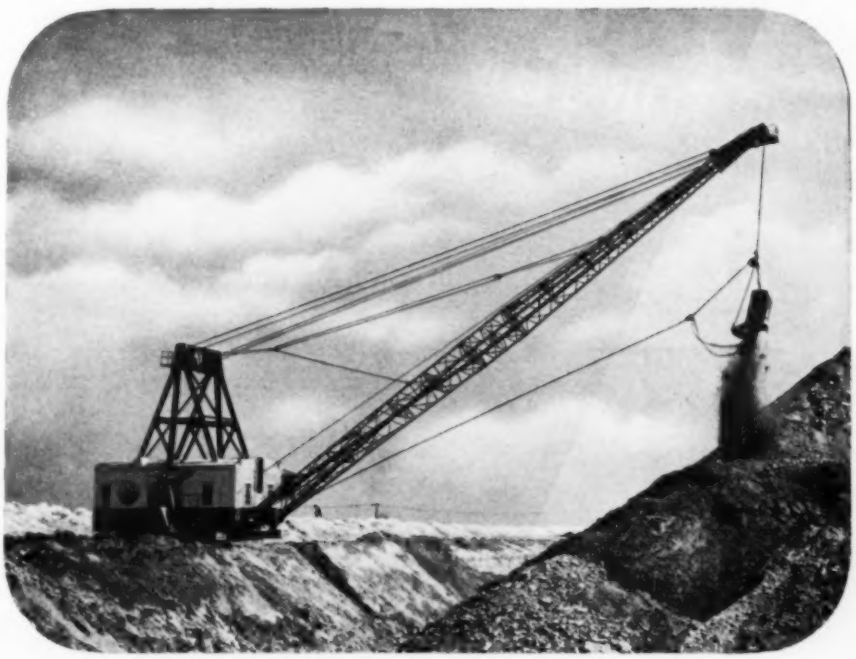
Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Warehouse Stock: 111 N. Canal St., Chicago, Illinois **Distributors in all Principal Cities**

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

WIRE ROPE



This is the most economical rope we've ever made for mining

ROEBLING is the best known name in wire rope. That's partly because we were the first wire rope maker in America. But more than that, we've always led in developing better wire and better rope for every purpose.

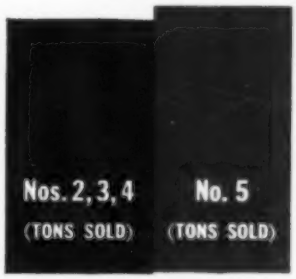
Today's Roebling Preformed "Blue Center" Steel Wire Rope is the miners' best choice for efficiency and long life. This rope has extra resistance to crushing and abrasion . . . takes rough going. It saves you time and cuts costs.

There's a Roebling wire rope for top service on any job. Call on your Roebling Field Man for his recommendations. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 701 ST. CLAIR AVE., N. E. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

BUILT FOR THE KING-SIZE LOADS



To offset the crushingly heavy loads encountered in modern mining, Bethlehem has long recommended the use of heavier steel ties—and in recent years the trend has clearly been in that direction. Note, for example, the graph shown above. Tonnage of Bethlehem 5's sold in 1951 exceeded the combined tonnages of the lighter 2's, 3's, and 4's.

Here's Bethlehem's No. 5 steel tie, which needs no introduction to most people in the coal-mining business. It's a sturdy, rugged tie, one that's every bit as husky as the picture indicates.

The No. 5 is designed specifically for 40-lb rail; designed to support the massive cutters, motors, and other equipment so common in present-day practice. It easily bears the weight of those giant new mine cars with full load.

Yet there's nothing cumbersome about the No. 5. Weighing only 5 lb per ft, it's a simple tie to install. Merely position the fixed clip against the rail base; then tap the revolving clips into place. That's all there is to it.

This tie can be taken up and reused many times before it wears out. In today's mining, it will do a better, less costly job by far than ties of lighter section. We'll be glad to show you why, any time you say.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

A special 2¼-yd. coal loading dipper is available for the fast, dependable 38-B shown here. Standard dipper is 1½-yd.

Stand-Out On the Coal Seam

BECAUSE they load fast and load big . . . because they stay on the job year after year for dependable output . . . because they're easy on the operator and low on operating and maintenance costs — these are some of the reasons why Bucyrus-Eries are such outstanding performers on coal seams all over the nation. Experienced Bucyrus-Erie design provides the balanced speeds and power that mean a fast, smooth cycle. Careful laboratory control of materials puts strength and durability into every part. Simple, easily accessible machinery means less time out for servicing and maintenance. Your Bucyrus-Erie distributor has full information on ⅜- to 4-yard gasoline, diesel and single-motor electric excavators. See him for complete details.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

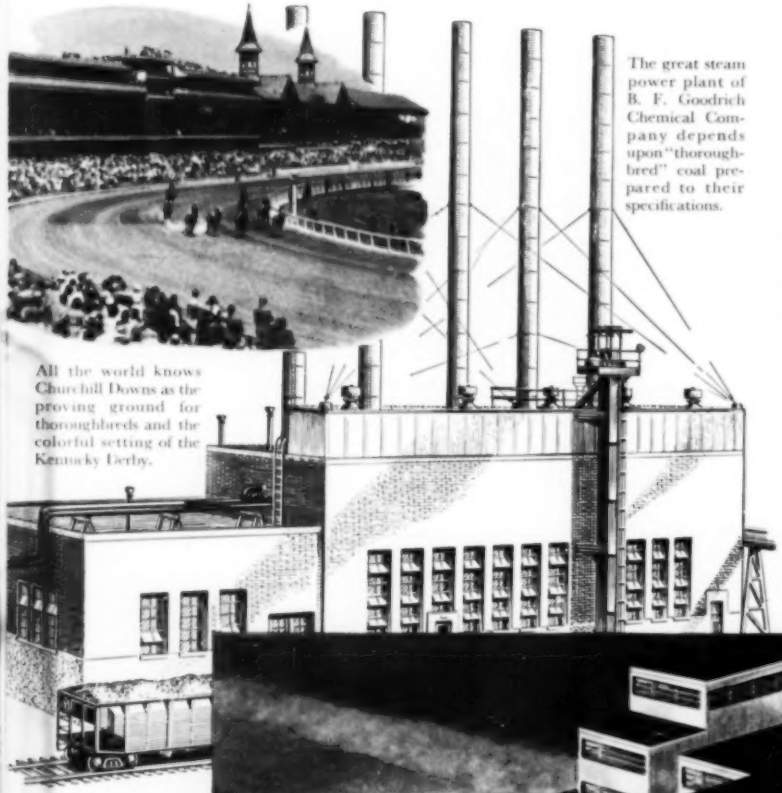
220ES0

Markets for WASHED COAL

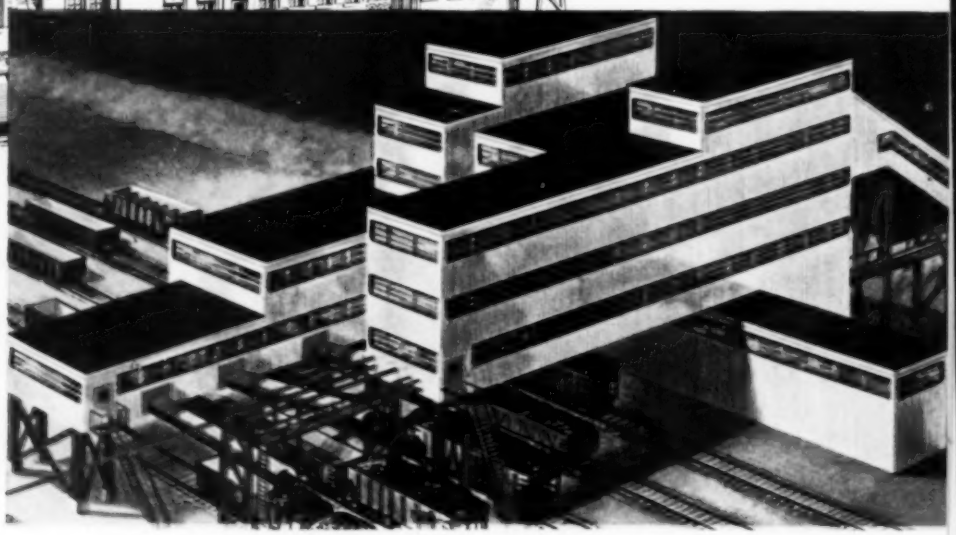
wherever you go

Louisville for instance

All the world knows Churchill Downs as the proving ground for thoroughbreds and the colorful setting of the Kentucky Derby.



The great steam power plant of B. F. Goodrich Chemical Company depends upon "thoroughbred" coal prepared to their specifications.



● ***The city of thoroughbreds*** is particular about many things . . . horses, plantations, tobacco, University of Louisville, the proposed Henry Watterson Expressway (Inner Belt), Chamber of Commerce . . . all that's finest. It is also particular about the coal it burns.

Profit-minded executives in industry insist upon thoroughbred coal . . . coal capable of carrying the load . . . coal producing the highest Btu for their fuel dollar . . . coal produced in McNally Pittsburg plants. B. F. Goodrich Chemical Company is typical.

Other progressive manufacturers in this great industrial area are just as particular about the coal they burn. They have proved the low steam cost possibilities of using *washed coal*.

Illustrated below is a plant exemplary of the many ultra-modern fully automatic coal preparation plants designed, manufactured, and erected by McNally Pittsburg in the eastern and western Kentucky region serving the great Louisville area.

You are invited to consult with us on the possibilities of selling in the large tonnage, stable markets by up-grading your coal.

(Reproduction of advertisement substantially as it appeared in Fortune Magazine.)

McNALLY PITTSBURG MANUFACTURING CORPORATION . . . *Manufacturing Plants:* PITTSBURG, KANSAS • WELLSTON, OHIO

McNALLY PITTSBURG

helps you to

capture the Big Markets

Write for These Helpful Books

If they are not already in your files, you need them. They contain complete engineering data regarding McNally crushers, washers, and dryers. In a recent survey among coal users, it was found that what they want most in their coal are clean quality and dry coal that will handle easily. With McNally equipment, you can easily meet these exacting specifications.

● ***Modern coal preparation plants,*** like illustrated on the preceding page, house the equipment such as crushers, screens, conveyors, control panels, washers, dryers which operate mechanically as a unit to produce the grade coal customers specify.

McNally Tromp Dense Media Bath . . . the latest washing system added to the McNally line. Now . . . you can wash large lump down to $\frac{1}{4}''$ at laboratory efficiency in the more difficult low-gravity and extremely high-gravity coals. Patented Laminar flow principle utilizes coarse ground magnetite, mill scale, limestone, or other dense media specific gravity particles. This fully automatic system cleans coal with sink-float efficiency at low cost . . . write for Bulletin 451.

McNally Gearmatic Breakers and Crushers used in the primary circuit for reducing run of mine in large sizes to screening sizes. Lumps break apart freely without grinding off an excessive amount of small particles and at 750 to 1400 TPH. Gearmatic stoker coal crusher illustrated below in capacities from 60 to 300 TPH . . . write for Bulletin 151.

McNally Pulso Dryer solves thermal drying's most difficult problem in the $\frac{3}{8}''$ x 0 range. No dust . . . no degradation . . . no air pollution when drying fines . . . and no loss of coal tonnage due to degradation. Moisture is evaporated 100% without a drop of effluent. Available in tonnage capacities to meet your needs . . . write for Bulletin 551.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

ENGINEERING & SALES OFFICES: PITTSBURGH • CHICAGO • RIO de JANEIRO • PITTSBURG, KANSAS • WELLSTON, OHIO

Walks away with tough payloads!

Pile on a capacity payload. Then watch a big, rugged International walk away with it!

The International for you is built to stand up through your toughest jobs, at less operating and maintenance cost. It's the result of the same engineering that has kept International the heavy-duty leader for 20 straight years.

That means you can expect consistently high performance and longer truck life, plus greater comfort and easier handling.

There's more to tell, so see your International Dealer or Branch soon, and start saving money!

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Look for these International exclusives:

- Powerful, dependable, economical gasoline, diesel or LPG power plants for rough, tough going.
- The "roomiest, most comfortable cab on the road"—the Comfo-Vision Cab. One-piece, full vision windshield. New green tinted "Solex Duplate" glass available.
- Super-steering system—more positive control, easier handling and 37° turning angle.
- Extra heavy-duty specialization—includes engine transmissions, axles, springs, frames, etc. . . . engineered for your special job to save you money.
- More than half the International Trucks ever built are still on the job.
- America's largest exclusive truck service organization.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS

"Standard of the Highway"

QUICK, EASY DISASSEMBLY MEANS

Low Service Cost

1. Disconnect drive, loosen casing bolts and lift bolt assembly from slot. Bolt, nut and washers are still connected for easy reassembly.

2. Swing out rotating element. Neither suction nor discharge piping is disturbed. All wearing parts are fully accessible for inspection or servicing.

Back in Service in less than a Half Hour

ALLIS-CHALMERS

Coal Washing Pump

Only 5 Wearing Parts

Shaft sleeve, impeller, casing, two wear plates. All easy to handle and easy to replace.

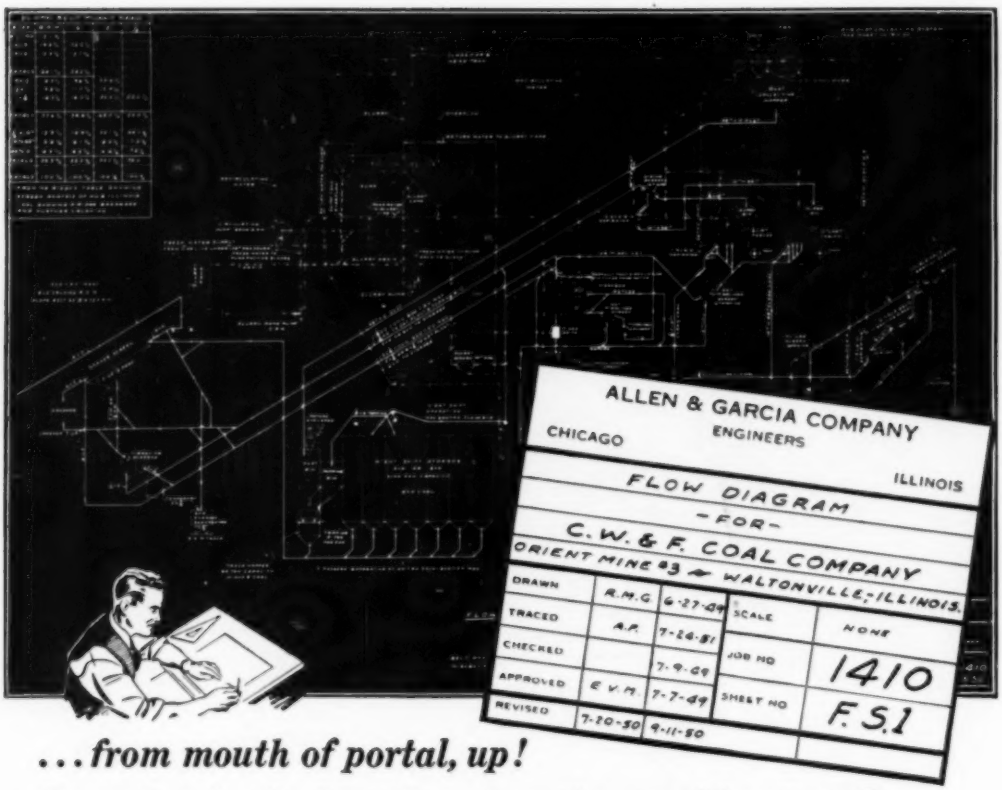
YOU CAN SEE for yourself how quick and easy it is to service an Allis-Chalmers Coal Washing Pump. Fast servicing like this plus long runs between servicing keeps your pumping costs low.

You get long life from Allis-Chalmers Coal Washing Pumps, too, because they are made of special hard *Allisite* alloy . . . because they have thick sections and heavy parts throughout . . . and because they are application engineered by specialists who know coal washing problems and how to solve them. Allis-Chalmers can supply the complete pumping unit — pump, motor, drive and control — of matched components from one reliable source with one guarantee of satisfaction.

Get complete information on Allis-Chalmers Coal Washing Pumps from your nearest Allis-Chalmers Authorized Distributor or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, asking for Bulletin 08B6381. A-3783

Allisite is an Allis-Chalmers trademark.

ALLIS-CHALMERS



. . . from mouth of portal, up!

Completely designed and engineered by A & G

Yes, from mouth of portal, *up* . . . A & G engineers *completely* designed, detailed, purchased and supervised erection of the recently completed Orient Mine No. 3 for Chicago, Wilmington & Franklin Coal Co.

Allen & Garcia Company, a professional mine engineering service, combined scientific design with sound engineering principles to give this plant a flexibility that sets it apart from others.

Special design of the portal structure incorporates provisions to keep dust out of the main plant. "Prescription coal" can be produced *during* running operations. There are facilities for the removal of dust and fines from the coal *prior* to washing. The plant combines both wet and dry cleaning and has a 3,100 ton night storage capacity. Modern electronic panel boards centrally control all operations.

Here is another outstanding engineering achievement by Allen & Garcia Co. Why not discuss your mining problems with an A & G engineer today . . . preliminary consultation is yours without obligation.

SCOPE OF SERVICES

- Design and construction of new plants and their various units.
- Organization, operation and management of mines.
- Below ground modernization and mechanization.
- Reconstruction, revamping, or improvement of existing plants.
- General consulting work regarding power, equipment, operation, and various mining problems.
- Valuations for financing, fire loss, taxation purposes—reports and appraisals.

We work with undivided responsibility to you on a cost and fixed fee basis. We are not hampered by any connections which might prejudice the true professional engineering approach to your problem.

A & G CO.

Allen & Garcia Company

CONSULTING AND DESIGNING ENGINEERS

with a CARDOX - HARDSOCG

Surface AUGER MINER

No New Development Work

See how this AugerMiner drills into the exposed seam—brings out coal in mechanized flow for simple mechanical loading.

CARDOX-HARDSOCG Surface AugerMiners are restoring many a "dead" strip mine to new and profitable life. They're drilling up to 50 tons of coal per man-shift from seams where overburden had forced abandonment of mining by conventional methods.

Maybe you have such a property. If you have, find out how an AugerMiner can turn the coal you left behind you into low cost tonnage.

IT'S *BONUS* RECOVERY

Through earlier stripping you have already paid to expose the coal seam. Now use it as a new source of income, produced at a cost usually much less than for the original working. You'll get clean, high grade coal because vertical directional control keeps the auger drilling into the best part of the seam, avoiding rock and shale. Sizing is controlled, to some extent, by the type cutterhead used.

SIMPLE—PRACTICAL—FAST

The AugerMiner is trucked or towed on its detachable wheels to the face of the seam. Its self-contained elevator posts position it at the height of the seam. Then augers up to 40 inches in diameter drill back into the seam to a distance of 100 feet or more. Augers are extended in 6-foot lengths by means of the AugerMiner's hoist and removed as easily with the built-in retriever. AugerMiners are available with 95 or 145 HP engines for all conditions and thicknesses of seam.

Ask your nearest CARDOX Representative—or write for new AugerMiner Bulletin now.

HARDSOCG DIVISION
CARDOX CORPORATION BELL BUILDING • CHICAGO 1, ILLINOIS

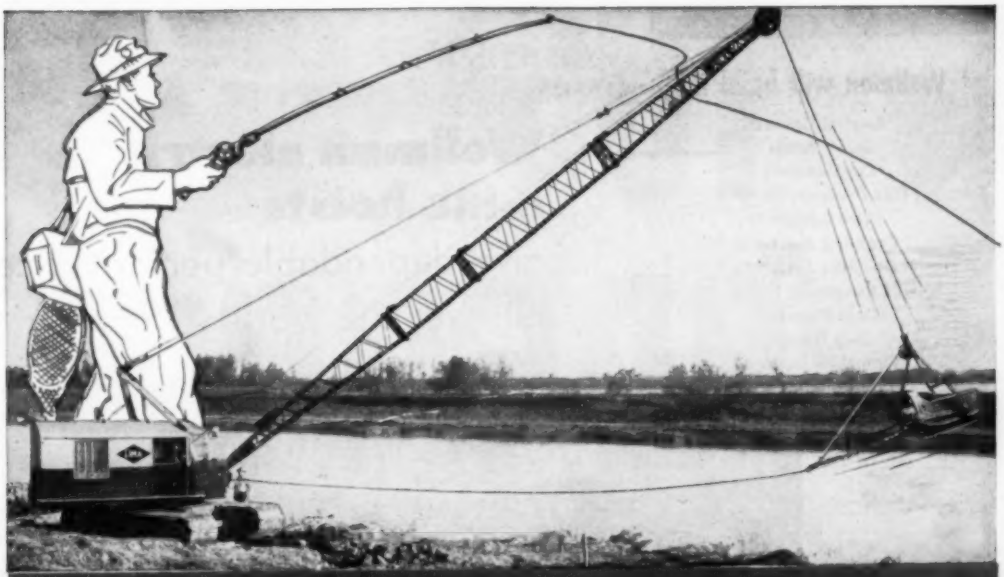
Use
RECORD MAKER Conveyor Belting

● Speed up operations above and below ground with Republic Rubber's tough Record Maker Conveyor Belting . . . **a belt specially made for handling coal** . . . a resilient rubber-covered belt that resists abrasion, wards off cutting blows and keeps steadily on the move despite constant flexing, buffeting, impact and other service stresses incidental to mining operations.

Record Maker Conveyor Belting is made with rounded edges, reinforced by an extra thick cushion of wear-resistant rubber. This feature, plus the special anti-mildew treated fabrics used in the ply construction, gives Record Maker Belting an increased work capacity that means bigger profits with less effort.

Record Maker Conveyor Belting, like all Republic Rubber Products designed for coal field service, is sold locally through expert Republic Distributors who, by making a free analysis of your exact needs, can help you toward better performance records and lowered costs. Contact your Republic Rubber Distributor today or write direct for further information.

INDUSTRIAL RUBBER PRODUCTS BY
REPUBLIC RUBBER DIVISION
Lee Rubber & Tire Corporation
YOUNGSTOWN, OHIO



LIMA DRAGLINES use *The Fisherman's Secret* FOR A GOOD CATCH

When you're fishing, and want to drop the bait in the far pool where the big ones are waiting, your reel's got to be *friction-free* to let that line flow out, smooth as cream from a jug. And, after the strike, come in the same way.

When you're after record yardage, a smooth flowing line is just as vital . . . so we took a tip from the fisherman, and made our reels friction-free. You can 'cast' the dragline bucket further, increase your radius of efficient operation from each location. You can bring in bigger catches, because more power is going into the work lines and less into *friction drag on the machinery*. And there's further big benefits from reduced maintenance . . . less frequent lubrication, and smoother operation, because misalignment from bearing wear, that affects clutch alignment and functioning, is eliminated.

Lima pioneered the use of anti-friction bearings at all important bearing points on draglines, shovels, and cranes. They've kept on pioneering with other improvements that put Lima equipment in the top rank of profitable performers. If you want proof of this—just ask the Lima user. If you want details on how to put Lima equipment on your *pay-off* roll . . . just get in touch with us.

BALDWIN-LIMA-HAMILTON CORP.

CONSTRUCTION EQUIPMENT DIVISION
LIMA, OHIO, U.S.A.

OFFICES IN PRINCIPAL CITIES OF THE WORLD

BALDWIN-LIMA-HAMILTON

BALDWIN · BLH · LIMA-HAMILTON

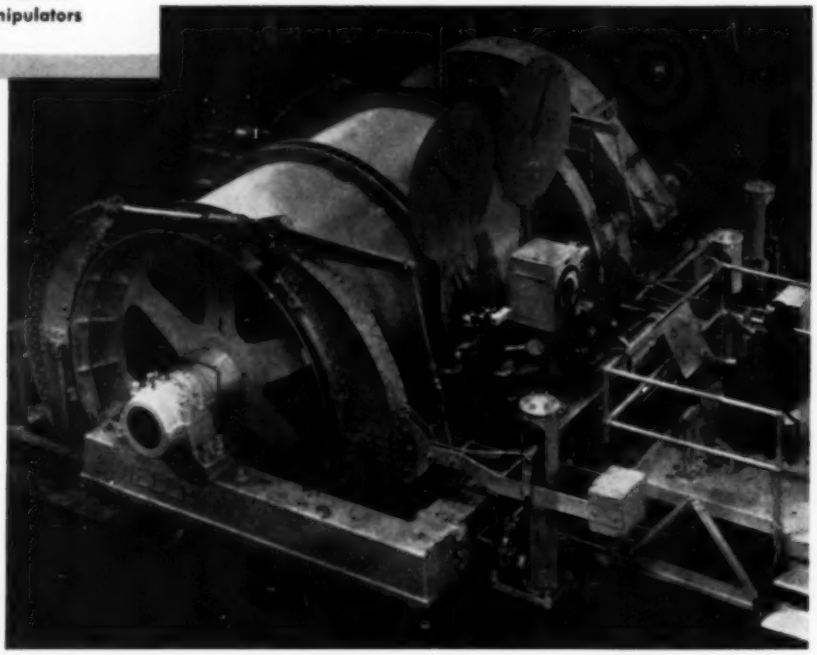
SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES

Wellman will build it

Special Cranes
Mine Hoists
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Skip Hoists
Clamshell Buckets
Forging Manipulators

Wellman electric mine hoists

give dependable performance all over the world



Wellman 10' x 4' 11" Double Drum Geared Electric Mine Hoist with 7' axial plate clutch and 10' Parallel Acting Brakes. Rated rope pull: 22,000 lbs.

● For more than half a century, in mines all over the world, Wellman Electric Mine Hoists have been used because they combine expert design with expert construction . . . featuring all the "modern improvements" developed in our many years' experience. Wellman Mine Hoists provide maximum safety, peak economy, and trouble-free operation under a wide variety of conditions. Let us give you recommendations for hoists that will do your job most satisfactorily.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE • CLEVELAND 4, OHIO

cut tonnage costs

with P&H ELECTRIC SHOVELS

In more and more locations these ultra-modern P&H machines are taking over the jobs that call for big production — steady digging. Users who know their cost accounting come back for more — for one proved reason . . . *lower tonnage costs.*

Contributing factors are these:

P&H Magnetorque* Hoist Drive powers hoisting motions electro-magnetically, gives you snappier dipper action — eliminates hoist generator, slip friction clutch and other troublesome mechanical devices.

P&H stepless power regulation is smooth and accurate — with no control fingers or contactors to give you trouble.

Independent propel, all-welded construction, filtered air cab and other modern refinements have led the way to more dependable production on a year-in, year-out basis.

If you seek lower tonnage costs in open pit work, let us tell you where you can see a P&H Electric Shovel in action. Ask about a P&H today.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch

Every third P&H Electric Shovel sold is a repeat order

HARNISCHFEGER CORPORATION

4540 West National Avenue • Milwaukee 46, Wisconsin

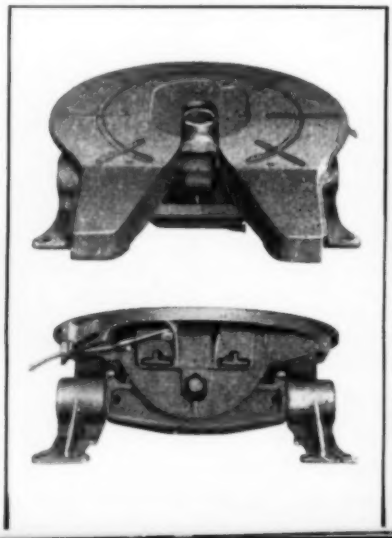
POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

Marion shovel, loading a 34-ton coal payload into one of 23 Austin-Western trailers powered by Dart tractors. Scene is at Midland Electric Coal Corporation's strip mine near Farmington, Ill.

ASF Safety 5th Wheels have to be tough to stand up in this heavy-duty service, especially during wet weather when tractors are needed at each end of the semi to get it out of soft ground. Because ASF 5th Wheels are so easy to uncouple, in effect Midland has a *flexible pool* of load-carrying equipment and motive power, rather than 23 separate units. The result is fuller, more efficient use of available equipment.

Back and turn on a dime—In addition to quick interchange between motive power and load-carrying equipment, the tractor-trailer is highly maneuverable. ASF 5th Wheels are side-oscillating: even a full load can be safely and easily jackknifed for a short turning radius.

Heart of the semi—the ASF 5th Wheel—36" extra-heavy-duty ASF Safety 5th Wheel made for the rugged service and heavy loads found in off-highway work. Note the heavily reinforced plate; the massive "I" section center beam; the extra-strong mounting brackets.



He speaks through firsthand experience—M. R. Heckard, Superintendent of Equipment, has used ASF Safety 5th Wheels on all semi's for 11 years. He particularly likes the comparatively new 36" wheel shown at left; feels it will cut maintenance costs to a new low.

The Midland Electric Coal Corporation proves that your best investment for efficient tractor-trailer operation is an ASF Safety 5th Wheel . . .

"Best of all—they're easy to uncouple"

Ease of uncoupling is one of the big reasons why ASF Safety 5th Wheels are standard equipment on the fleet of semi's at Midland Electric Coal Corporation's strip mine near Farmington, Ill. M. R. "Marty" Heckard, Superintendent of Equipment, says:

"We use ASF 5th Wheels on all our semi's, and each wheel takes a real beating during the loading and hauling of a 34-ton payload around 30 times a day.

"One of the main reasons why we like these 5th Wheels is because they are easy to keep free of slack. We just add a shim usually once a year.

"Best of all, however, they are easy to uncouple in a matter of minutes. We can easily shop the tractor for maintenance without the trailer, or vice versa. Working on one at a time makes servicing easier, and we avoid tying up the whole semi."

Quick interchange between motive power and load-carrying equipment is a real asset in mining and quarry work. And there's no denying that you get it with a tractor-trailer. But a 5th wheel—or any hitching device—tends to defeat its purpose if it's hard to uncouple.

Easy uncoupling can save you time, trouble and expense, as it has in this modern strip mine operation. But, it's equally important to know that the ASF Wheel *only uncouples when you want it to uncouple.* This is no beefed-up highway wheel. It's made specially for heavy-duty off-highway service, from the "I" section center beam to the side-oscillating plate that absorbs the sidestrain of uneven roadway. Until a twist of the wrist releases the king-pin, it's built to *stay* coupled—come shocks, strains or high water!

Get the facts on the best 5th wheel investment you can make! See your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever position. The easy-to-see lever can only be in this position when the jaws are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety dog up, and pull the lever forward.

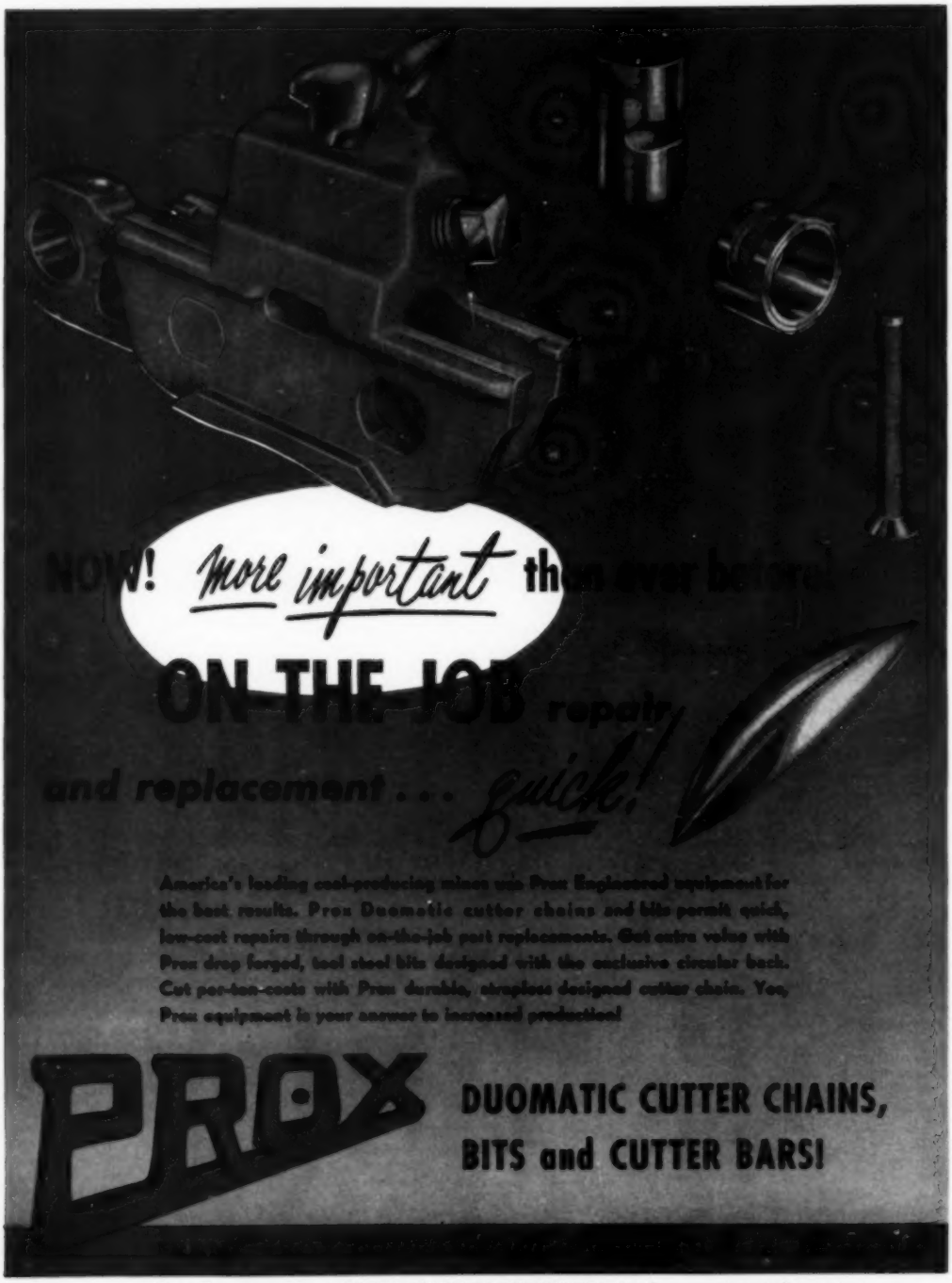
UNLOCKED—and ready for coupling. The lever moves back to locked position only when the jaws are locked!

A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING—as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING—3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.


NOW! more important than ever before!
ON-THE-JOB repair
and replacement . . . quick!
America's leading coal-producing mines use Prox Engineered equipment for the best results. Prox Duomatic cutter chains and bits permit quick, low-cost repairs through on-the-job part replacements. Get extra value with Prox drop forged, tool steel bits designed with the exclusive circular back. Cut per-ton-costs with Prox durable, strapless designed cutter chain. Yes, Prox equipment is your answer to increased production!
PROX
DUOMATIC CUTTER CHAINS, BITS and CUTTER BARS!

Consult your nearest PROX SALES REPRESENTATIVE for complete information:

P. L. JOHNSON, 519 East Main St., Hazard, Ky.

ROBT. A. THOMPSON, Hotel Madison, Madisonville, Ky.

T. E. FOSTER, P. O. Box 683, Uniontown, Pa.

CHARLESTON ELECTRICAL SUPPLY CO., Charleston, West Virginia.

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WESTERN SALES ENGINEERING CO., 375 So. West Temple, Salt Lake City (1), Utah.

CHARLES J. FORBES, Frank Prox Co., Inc., Terre Haute, Ind.

YES—IT'S HERE!

NEW U.S. ROYAL FULL-LUG CON-TRAK-TOR

NEW STRENGTH NEW TRACTION NEW OFF-ROAD SAVINGS!

NOW

● **Triple Impact Protection!**
Extra layers of rubber between plies.
Double shockpads extending well into sidewalls.
New rock-resister cap-plies in crown.

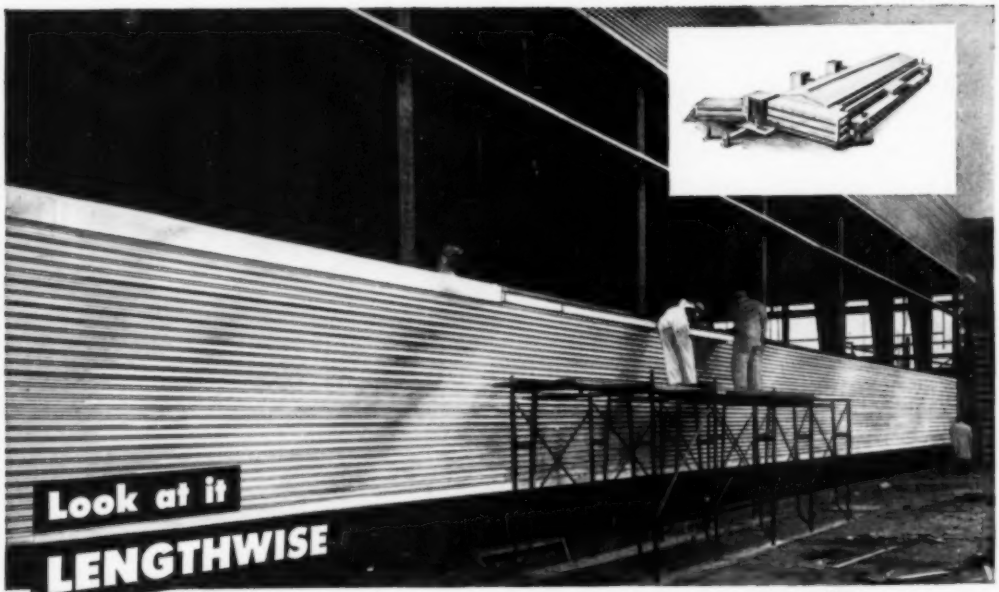
● **Full-Lug Traction!**
Exclusive full-width grip—lug-wide traction.
Open center—actually cleans itself.
Lugs are off-set—no sideslips.
Rounded shoulders for maximum flotation.

● **True Tire Economy!**
New cushioned carcass stands up longer for extra recaps.
Special-compound tread resists cuts—stops lug-shearing.
Super pulling-power means more work done per hour.

WANT FULL PROOF? Your U. S. Royal Dealer has it. Phone him today—he's in your "Classified."

Also Available in NYLON . . . for heaviest-duty operation. Utmost resistance to severest heat, moisture and shock.

UNITED STATES RUBBER COMPANY



...Longer Life, Lower Maintenance!

When Hytron, Division of CBS, planned its new Danvers, Mass., plant, architects and clients agreed on Reynolds *Lifetime* Aluminum Industrial Corrugated for siding. Low initial cost, long life and lowest maintenance were practical factors. But the architects—R. P. Systems Engineers—sought a design effect, too. So they specified *horizontal* application. General contractor was L. R. Porter Construction Company.

Both as siding and as roofing (vertically applied) this material saves substantially on labor costs. It is light weight, easy to handle... workmen like it. In addition, aluminum reflects radiant heat ...keeps interiors up to 15° cooler in summer and warmer in winter.

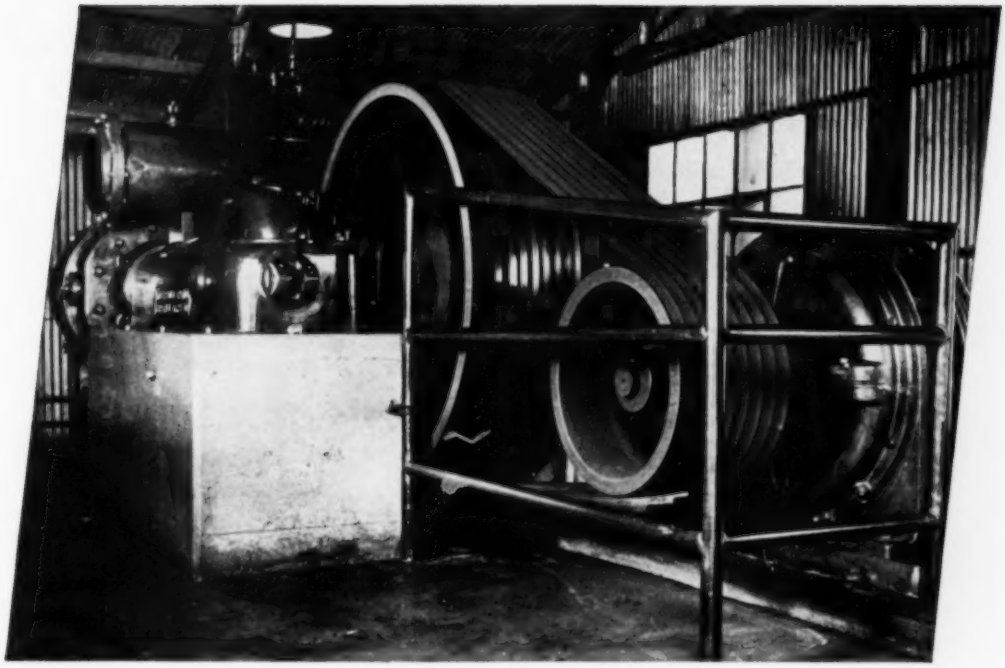
Plan your next construction with this high-strength aluminum that never rusts, resists corrosion.

Call Reynolds for literature and technical assistance...offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write to Reynolds Metals Company, Building Products Division, 2041 South Ninth Street, Louisville 1, Kentucky.

Specifications:
Thickness .032"
Weight 56 lbs. per square
Corrugations 7/8" deep, 2-2/3" crown to crown
Roofing width 35", coverage 32"
Siding width 33-3/4", coverage 32"
Lengths 5', 6', 7', 9', 10', 11', 12'

Military demands for aluminum limit supply, but Reynolds is rapidly expanding aluminum capacity. Rated orders receive priority handling.

REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED



Keep your production in the groove with **Thermoid V-Belts**

Production men, in all kinds of industries, rely on the greater strength and longer life in Thermoid V-Belts to provide smooth, efficient performance and long wear . . . keep production in the groove.

From huge multiple V-Belts of rayon grommet construction to the smallest fractional horsepower belts, you can always depend on Thermoid quality.

The result is V-Belts with minimum stretch and extreme flexibility . . . designed to transmit maximum power without slippage . . . able to withstand high speeds and absorb shock.

All these advantages add up to lower operating and maintenance costs, and in the long run, the most economical V-Belts you can specify for the job.

Call your nearest Thermoid distributor today. He has a complete range of sizes to meet your requirements. And for your special V-Belt problems, experienced Thermoid Sales Engineers are always ready to help you.

Thermoid Industrial Rubber Products

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

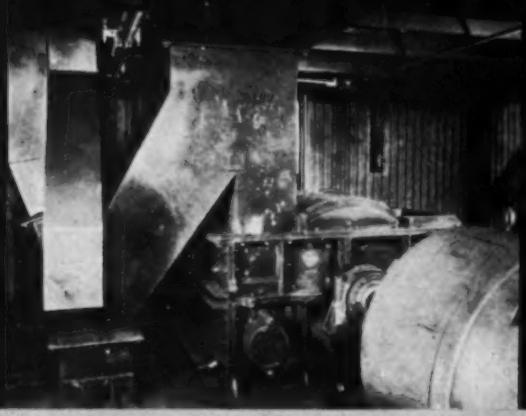
Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

AMERICAN CRUSHER REPORT *from Otter Tail Power Co.*

150,000 TONS LIGNITE REDUCED TO 3/4"

...Without Single Repair or Maintenance!



AMERICAN RING-TYPE CRUSHER INSTALLATION at the Otter Tail Power Co.—equipped with 150 HP direct motor drive for reducing up to 8" lump lignite to ¾" product—at the rate of 275 tons per day.

CRUSHED LIGNITE BEING CONVEYED TO STORAGE BUNKER on 408-foot Link-Belt conveyor.

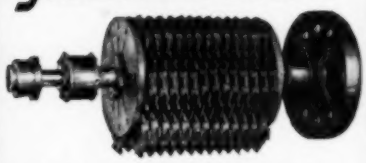
Since Nov. 18, 1950, this American AC3-C has been reducing ROM lignite and coal to a ¾" product—at the rate of 275 tons per day—for the Otter Tail Power Co., Ortonville, Minn.

This day-in and day-out performance record is notable for two reasons:

(1) Lignite, with lumps up to 8", makes up the bulk of the reduced fuel. Lignite is a tough, fibrous coal with high moisture content and a troublesome tendency to pack and cling.

(2) Not a single maintenance, repair or parts-replacement job has been necessary since installation. And the crusher is "still in very good condition with little or no indication of wear" according to the plant report.

HOW *American* DOES IT



Only American Rolling Ring Crushers have the patented manganese steel Shredder Rings that *split instead of crush* coal—resulting in a constantly uniform product with controlled fines, less maintenance and parts replacement.

Photos courtesy Link-Belt.

American PULVERIZER COMPANY

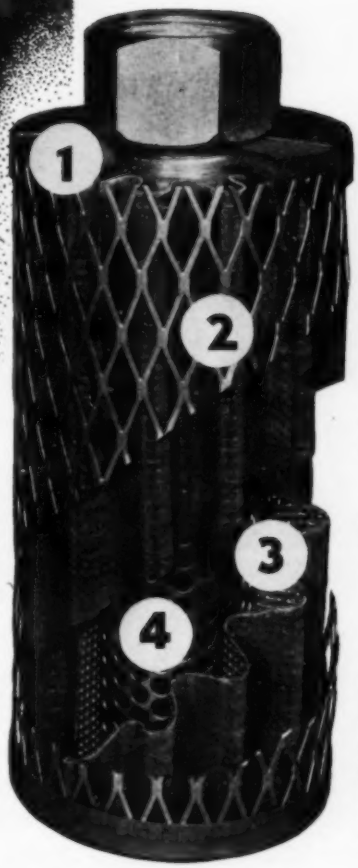
Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE., ST. LOUIS 10, MO.

first cost only cost

FOR ALL HYDRAULIC SYSTEMS

MARVEL SYNCLINAL FILTER



NO MOVING PARTS

1. Neoprene Washers. A perfect seal, oil resistant. No disintegration allowing particles to enter system and retard instant smooth operation.

2. Protective Outer Housing. Exclusive design of Marvel Filters guards fine filtering insert from damage due to careless handling.

3. Reinforced Insert. Extra strong wire for a reinforcement to maintain the design of insert for a long serviceable period.

4. Centering Tube. The core of the filter gives a sturdy construction to the whole unit; adds protection for the pump should maintenance of the filter be neglected.

Marvel Synclinal Filters are simple, efficient and have great capacity for space occupied. This permits longer operation between cleanings. No moving parts to get out of order. No need to stock spare parts.

Protect HYDRAULIC EQUIPMENT

IN 1951 ALONE OVER 30,000 MARVEL SYNCLINAL FILTERS have been specified for installation on all types of hydraulic and oil recirculating equipment. In the plants of America's industrial giants as well as in the plants of smaller businesses, Marvel Synclinal Filters are doing a job protecting machines and increasing production. They are proving their superiority in the one real test — on the job. Records show Marvel Synclinal Filters operating longer between cleanings, requiring less attention, cutting down time, and in short, achieving more production with less maintenance. Not only plant operators, but also over 270 manufacturers of machines have recognized the superiority of Marvel Synclinal Filters and now install them as original equipment.

★ **WATER FILTERS** In response to the great demand we have adapted both our sump and line models for use in all water filtering applications. No changes have been made in the basic Synclinal design.

A SIZE FOR EVERY NEED

in filtering non-corrosive liquids in hydraulic and low pressure systems. Sump and line type models available in capacities from 5 to 100 g.p.m. and in mesh sizes from 30 to 200. All models may be quickly disassembled, cleaned and reassembled on the spot by any workman. Line types operate in any position and are easily serviced without disturbing pipe connections.

Write for Complete Engineering Data—Specify Oil or Water

Meets J. I. C. Standards

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

Feeding time for a hungry workhorse -2000 feet down!
HERE... EVERYWHERE ...WHEREVER METAL TOUCHES METAL
Alemite "Friction Fighters"
SAVE WORK! SAVE TIME!
KEEP VITAL EQUIPMENT RUNNING SMOOTHER, PRODUCING LONGER!

Alemite Helps Slash Maintenance Costs!

By protecting vital moving parts, you end bearing failures in advance! Alemite barrel pumps have the power and "push" to thoroughly flush-out old grease and gritty coal dust from bearing surfaces. Help keep equipment running longer—at less cost!

Alemite Assures Clean, Safe Lubrication Fast!

Below ground or above ground, there is a better Alemite method for transferring, loading or applying grease. Refinery-sealed lubricants are kept clean. You save time...save grease...save work.

Alemite Reduces "Downtime" . . . Saves Man Hours!

Faster, easier Alemite methods reduce machine "downtime" for lubrication. Help increase coal tonnage. Bring you pumps that can be powered with air or electricity, for use in shaft and strip operations or in coal preparation.

ALEMITE

Lubrication Methods that Cut Maintenance Costs

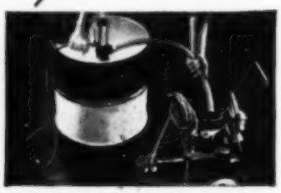
Barrel to bearing — Alemite cuts costs three ways

There's An Alemite Pump Just Right For Your Job!

Check today with your local Alemite supplier or write Alemite, Dept. E-82, 1850 Diversey Parkway, Chicago, Illinois.

1. In Applying Lubricants . . . by saving up to 23.9 man-hours for every 100 pounds of lubricant applied to bearings.

2. In Loading Grease Guns . . . by saving 3¾ man-hours for every 100 pounds of lubricant loaded into hand guns.



3. In Transferring Lubricants . . . by cutting man-hours 63% for every 100 pounds of lubricant transferred.

Eaton Tandems give you all these important features—

EATON AXLES—the load-carrying and moving components—are performance-proved by thousands of units and millions of miles of service. They are installed in the position for which designed and, therefore, are not subject to abnormal stresses or to unnatural lubricating problems.

- The single drive line permits a natural angle and direct lead of the propeller shafts; eliminates excess parts; simplifies maintenance.
- The power divider, of simple design, assures the transmission of power equally to both axles.
- A third differential in the power divider assures equalized power transmission to the driving wheels even though wheel speed may be variable due to road irregularities or differences in tire diameter.
- The differential lock between forward and rear axles (optional on some models) is positive in action. With unfavorable road conditions such as mud, snow, and ice, this feature makes maximum traction available when required.

Your truck dealer will be glad to explain how Eaton Tandem Drive Axles give your trucks greater load capacity and at the same time reduce tire maintenance and operating costs.

EATON
Tandem Drive
AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

Swing's the thing

WITH GOODMAN TRACTOR TREAD LOADERS

Type 865 — 26½" high
Type 660 — 33" high
Type 665 — 43" high

SWING OF LOADING HEAD

. . . 40° to either side of centerline.

Wide loading path with only forward and backward tramming.

Good cleanup, corners loaded out, close posting no handicap.

VERTICAL LIFT OF LOADING HEAD

. . . from below mine floor to well above.

Tight coal can be attacked at most desirable height.

All coal on irregular bottom loaded out without digging in.

SWING OF DISCHARGE END

. . . 40° to either side of centerline.

When combined with swing of loading head, crosscuts can be driven at 90° angles in confined areas without double handling of coal; pillars can be loaded with maximum recovery.

VERTICAL ADJUSTMENT OF DISCHARGE END

Can be raised or lowered for correct discharge height into conveyor or shuttle car.

Before you decide on any, see Goodman swing-motion loaders in action. They are winning new friends every day throughout the coal fields. Let us arrange a mine visit so you can see for yourself their many advantages.

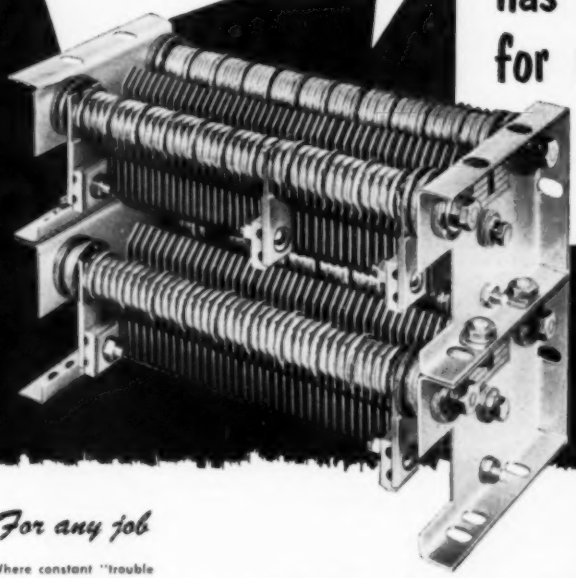
Goodman MANUFACTURING COMPANY
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS

There is a *difference* in Resistors

P-G

has proven this for many years

Steel Grid Resistors for COAL MINES Since 1915



Designed to fit your present resistor space

For any job

Where constant "trouble free" resistor service is wanted...you can safely specify P-G Steel Grid Resistors and get better performance with low cost maintenance.

Different, because steel and mica, both extremely durable materials, coupled with P-G exclusive design produce a resistor of great mechanical strength. There is nothing to break. With accurate resistance values and adequate carrying capacities, P-G Resistors outlast ordinary resistors. Tell us your specifications and let P-G solve your resistor problem.

P-G

The Nonbreakable Steel Grid Resistor

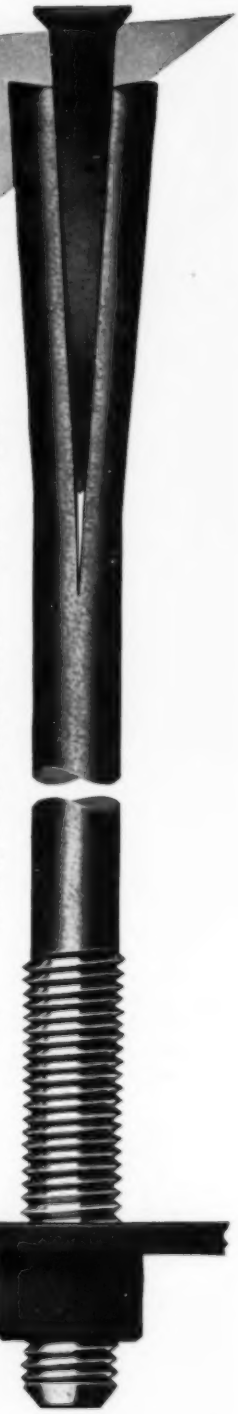
THE POST-GLOVER ELECTRIC COMPANY

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO

The time to start is now

Illustrating shield partly expanded, after insertion in hole.



The sooner you get started on a roof-bolting program, the sooner you'll begin to enjoy the advantages: the greater safety, increased economy, and freedom from space-consuming timbers in addition to faster transportation and less material-handling, as well as wider mine openings, with improved ventilation.

Bethlehem offers two types of roof bolts to mine operators. Each bolt comes in a variety of lengths, and can be used vertically or at an angle. Write for full particulars.

BETHLEHEM SQUARE HEAD ROOF BOLT
(WITH EXPANSION SHIELD)

An assembly, consisting of unchamfered square-head rolled-thread ¾-in. bolt, plug, and expansion shield. Pressed ears on bolt shank support shield during anchoring. Plug is forced into shield when bolt is tightened, expanding the shield to provide holding-tension. Projections on leaves of shield contact sides of hole, prevent shield from turning when bolt is rotated.

BETHLEHEM SLOTTED ROOF BOLT

Forged slot accommodates wedge. Slot is centered by exclusive process which forms the equivalent of two half-rounds. No steel is lost through burning. Opposite end of bolt has 5 in. of 1-in. rolled threads. When driven against back of hole, wedge is forced deep into slot, expanding bolt-ends. Truncated-cone point prevents damage to threads. Complete with American Standard Regular Square Nut.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM'S EXHIBIT at the 1952 Mining Show, Denver, will feature the following products:

Roof Bolts • Steel Ties • Ar-Moored Ties
Mine Frogs • Wire Rope • Wheels

Plan to visit us in Booth 1420, Auditorium Floor

BETHLEHEM STEEL

BETHLEHEM MINE ROOF BOLTS

Get these savings in your clutches

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricants

● Clutch repairs costs down 50% . . . no delays for "warming up" loaders . . . easier and faster loading . . . these benefits have been brought to midwest mines by SUPERLA Mine Lubricants. Here's why these products will assure similar benefits for you.

SUPERLA Mine Lubricants keep transmission cases clean. Clutches operate easily with no gumming or coking caused by oil deposits. When machines are started, these lubricants flow readily between clutch plates, protect them against wear, eliminate "clutch drag" and the necessity for warming up loaders. During long periods of continuous operation, SUPERLA Mine Lubricants do not thin out excessively, provide safer lubrication for clutch plates.

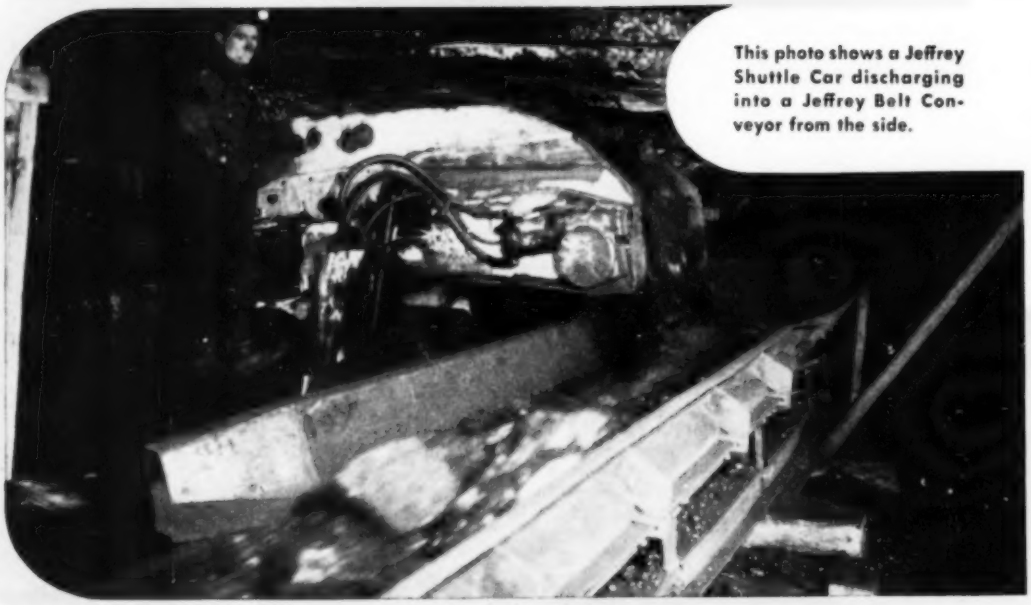
A test of SUPERLA Mine Lubricants will prove their ability to keep your loaders on the job longer with less maintenance. These products are available in oil and grease grades suitable for any type of cutter or loader. A Standard Oil lubrication specialist will gladly help you select the proper grades for your equipment. You can reach him by phoning your local Standard Oil Co. (Ind.) office. Or, write: Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY

STANDARD OIL COMPANY
STANDARD
(Indiana)

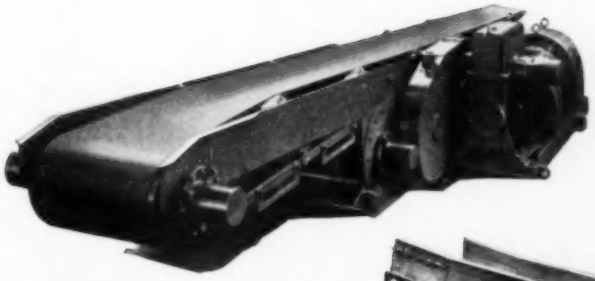
....BELT CONVEYOR AND

Photo illustrates a Jeffrey Shuttle Car discharging into end of Jeffrey Belt Conveyor.

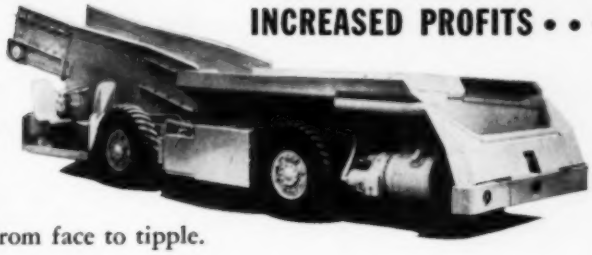


This photo shows a Jeffrey Shuttle Car discharging into a Jeffrey Belt Conveyor from the side.

SHUTTLE CAR COMBINATION



TEAM-WORK that pays off in GREATER PRODUCTION LOWER OPERATING COSTS INCREASED PROFITS • • •



● The way in which these Jeffrey Conveyors and Shuttle Cars work together results in one of the most modern methods of transporting coal from face to tipple.

Jeffrey Belt Conveyors for intermediate and main haulage handle large tonnages rapidly and provide low cost maintenance and operation. Extensions are easily and quickly made to keep up with room development.

Jeffrey Shuttle Cars, operating between the loader and conveyor, have come about as close to continuous operation as any system developed to date. Here's team-work at its best. These cars are available in cable reel types with either two or four wheel drive and steering . . . in capacities from 3.75 to 7.75 tons.

Call in a Jeffrey Mining Engineer. He will be glad to help you determine the best arrangement and equipment best suited to your operation.

THE JEFFREY MANUFACTURING COMPANY

912 North Fourth St., Columbus 16, Ohio

Complete line of Material Handling, Processing and Mining Equipment

Baltimore 2 Beckley, W. Va. Birmingham 3 Boston 16 Buffalo 2 Chicago 1 Cincinnati 2 Cleveland 15 Denver 2 Detroit 13 Forty Fort, Pa. Harlan, Ky. Houston 2 Jacksonville 2 Milwaukee 2 New York 7 Philadelphia 3 Pittsburgh 22 St. Louis 1 Salt Lake City 1

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

You Can Cut this High Cost Yourself!

*Eye Accidents Cost $176,000,000 a year in LOST MAN-HOURS alone**

If you have a defense contract (or even if you haven't) the shortage of skilled workers is probably one of your plant's most critical problems. Like many other companies perhaps you can obtain extra man-hours of production without adding a man or machine . . . if you PREVENT COSTLY EYE ACCIDENTS!

Your MSA Representative can show you how a safety goggle costing about $2.30 can prevent 98% of all eye injuries and pay for itself in *less than two hours* of a skilled *worker's time.* Or write American Optical Company, 467 Vision Park, Southbridge, Mass.

*Estimate. Industrial eye injuries cost over $5 per employed worker per year — with compensation averaging nearly $400 per injured man.

AO's Industrial Program increases production, decreases accidents. Write today for free booklet "Improved Industrial Vision."

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

So DIFFERENT... They're Patented!

Power Plus Anti-Rust Protection at No Extra Cost

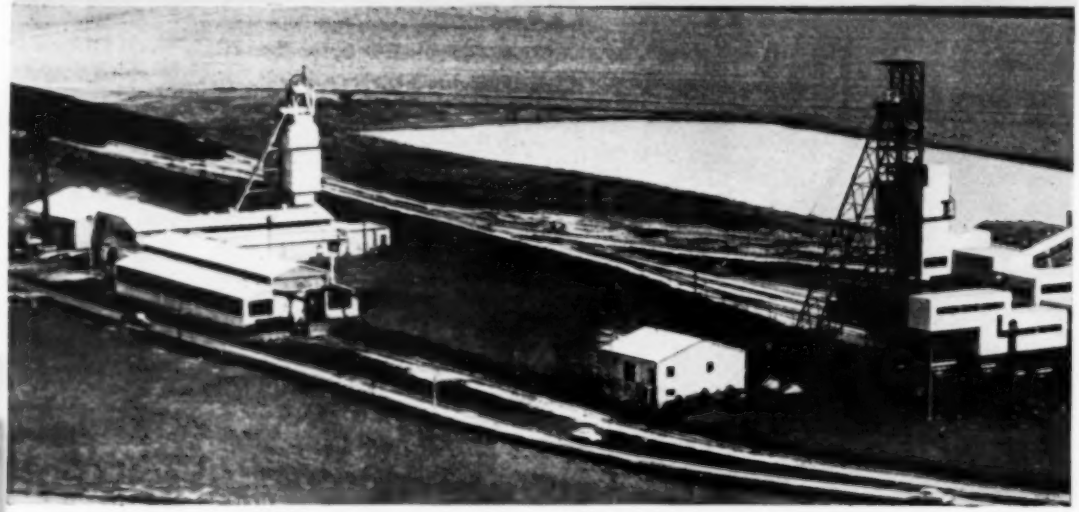
Here are fuels so *different* they have been PATENTED—so *revolutionary* in action that they result in actual dollar savings for Sinclair users.

How? Sinclair fuels—and *only* Sinclair—contain the rust inhibitor RD-119®. This amazing chemical forms an invisible waterproof film throughout the equipment's fuel system—from fuel tank to combustion chamber. Used regularly in gasoline engines, Sinclair Gasoline with RD-119 *prevents* rust and corrosion—can save you costly repairs to carburetors and fuel pumps. Regular use of Sinclair Diesel Fuel containing RD-119 eliminates the problem of rust-clogged injectors.

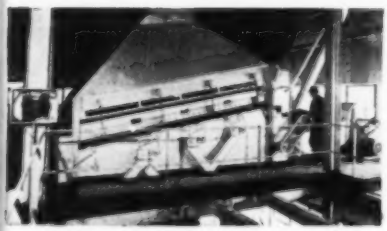
Now, get *Full Power, High Anti-Knock* PLUS the *Anti-Rust Protection* of RD-119—exclusive with Sinclair... AT NO EXTRA COST! Phone your local Sinclair Representative today about Sinclair Anti-Rust Fuels.

Sinclair Refining Company, 600 Fifth Ave., New York 20, N. Y.

Freeman's New R & S-Engine
CONVERTS LOW-PRICE STEAM

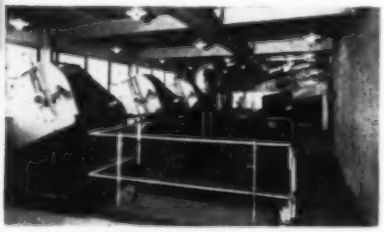


The New Crown Mine Plant, Farmersville, Illinois — Capacity: 10,000 tons per day.



Air-Washed All 1½" minus coal is processed by Roberts & Schaefer air-washing units which remove all impurities via air—resulting in a coal of highest BTU content and free from extraneous moisture.

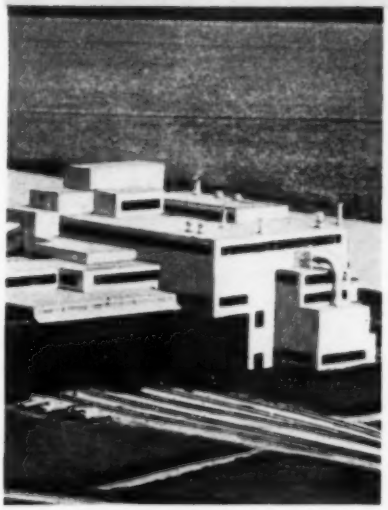
Low Temperature Drying Fine coal is heat dried at low temperatures to increase efficiency and amenability to air-washing.



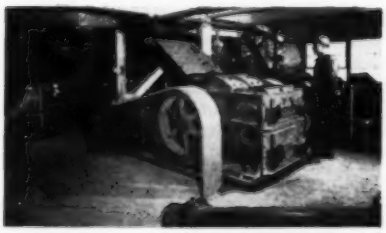
Wet-Washed Crown 1½" plus coal is washed by large jig washers. This cleaning system together with air-washing results in a product that meets more exacting specifications.

Conveyed on Rubber Crown Coal is conveyed on rubber in the main haulways as well as through the gallery and all surface installations. This method of handling preserves size and helps reduce degradation.

ered Crown Mine Plant —— COAL INTO A PREMIUM FUEL



Low-Head Screens The high rate of vibration permits greater "flowability" resulting in more exacting and uniform screened sizes, firmer coal and less degradation.



Any Size At Crown the use of crushers strategically located throughout the preparation plant can reduce washed coal to any size and specification.

You'd enjoy a trip through Freeman Coal Mining Corporation's new combination wet-and-dry-washing preparation plant at its Crown Mine at Farmersville, Illinois. You would see the most advanced technique, the most modern equipment applied to the problem of producing premium fuel from the Central Illinois No. 6 seam, which, for a number of years had been mined and shipped without beneficiation for use as a low-priced steam coal.

Step by step, you would see how modern preparation and handling combine to upgrade No. 6 seam coal to its maximum BTU potential *and maximum market value.*

Coordinated engineering, fabricating and construction service . . . a wealth of experience . . . unbiased counsel . . . a record of results: these are the things that companies look for and get from R&S. They are the reasons for more and more repeat business from satisfied operators like Freeman . . . reasons why you should consult Roberts and Schaefer Company when *you* have coal preparation problems.

Like to know the full story of the Crown Mine Plant? Write for copies of the "Crown Story"—but do it today, because the quantity is limited.

ROBERTS and SCHAEFER CO.

130 North Wells Street, Chicago 6, Illinois

1315 Henry W. Oliver Bldg. PITTSBURGH 22, PA. | P. O. Box 570 HUNTINGTON 10, W.VA. | 254 West 54th Street NEW YORK 19, N. Y.

FOREIGN DEPARTMENT:
International Mfg. & Equipment Co., Inc., 220 Broadway, New York 38, U.S.A.

Why U. S. Rubber V-belts *cut overhead*

Savings in Maintenance: Inherent stretch is worked out mechanically in the factory; take-up is seldom, if ever, necessary. If required, the belt can be made oil-proof.

Savings in Power: Because U.S. Rainbow V-belts have practically no slippage, there is no loss of power between driver and driven machines.

Savings in Replacement: U.S. Rainbow V-belts last longer because they are not affected by moisture, cold, or heat.

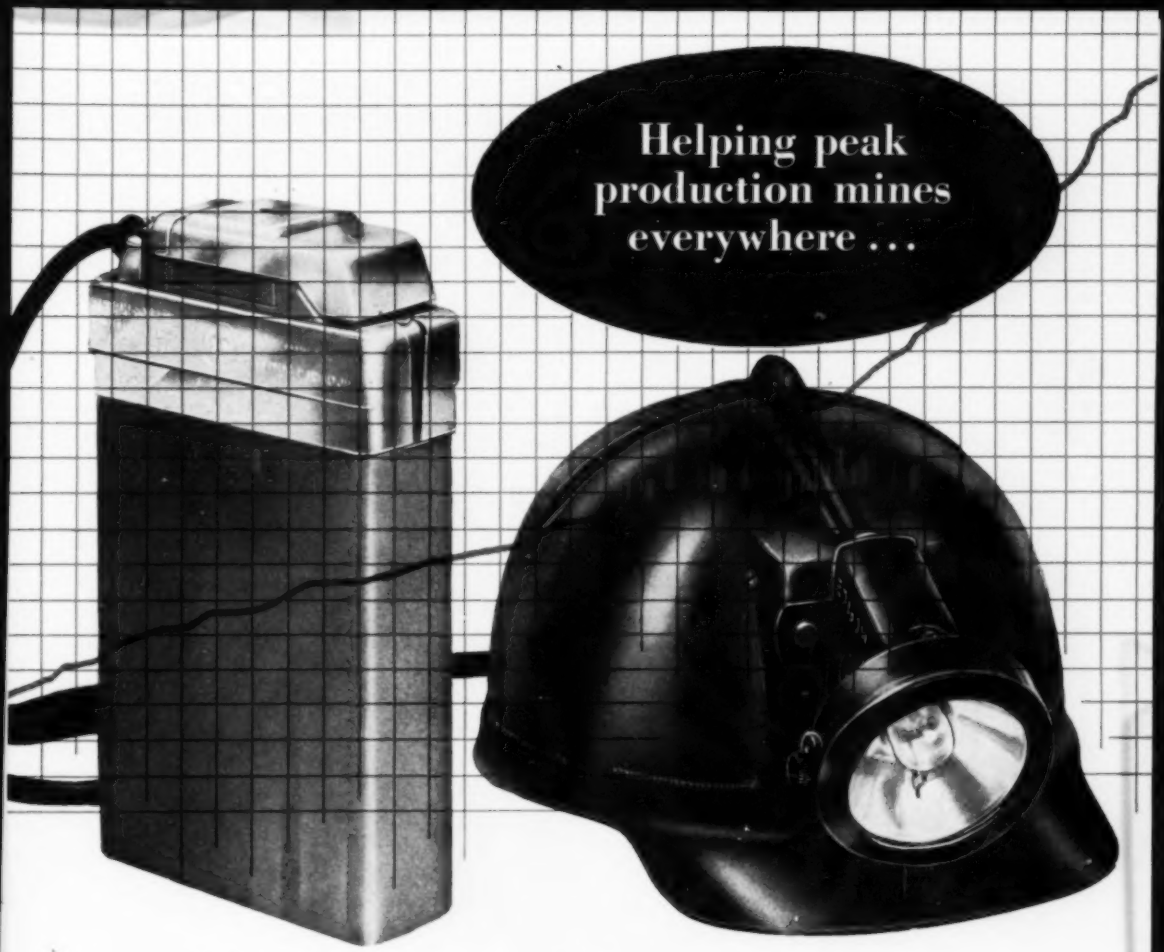
To reduce any heat generated by constant flexing, and to get maximum adhesion between the component parts of the belt, the cords are treated with latex. Every U.S. Rainbow belt has the unique Equa-Tensil Cord Section—the U.S. Rubber development that insures sufficient pull and strength under diverse operations. Order from your jobber, or for more information, write to address below.

HITCH YOUR DRIVE TO A U.S. RAINBOW V-BELT

PRODUCT OF U.S. RUBBER — SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



Utilize the *greater output*
that's *built into* mechanized equipment . . .

the EDISON R-4 ELECTRIC CAP LAMP

The more and better light of the Edison R-4 Lamp is transferring the production advantages of today's modern equipment into steadily climbing tonnage figures in the nation's top production operations. Throwing a brilliant, unfailing beam, this vital mining tool gives miners the light they must have to work mechanized equipment at its greater capacity, safely.

MSA
SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STS., PITTSBURGH 8, PA.
At Your Service: 68 Branch Offices in the United States
MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED
Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

When you have a safety problem, M.S.A. is at your service. Our job is to help you.

The House that Jack Built

(AND ALMOST EVERYTHING HE PUT IN IT)

—is made with COAL!

Without coal there would be nothing made of steel in Jack's house. No refrigerator, no vacuum cleaner, no washing machine—for *every* ton of steel uses a ton of coal in the making. Without coal Jack would be lucky to have any electricity to run his lights and appliances—the vast majority of America's utilities generate electricity with coal. Indeed, almost *all* of today's great variety of fine products—including the very cement and brick that go into Jack's house—are manufactured with heat and power supplied by coal!

That's why it's good to know America's coal resources are large enough to last for centuries—that America's 5,000 privately managed and competitive coal companies are the most efficient in the world!

Are you responsible for choosing the fuel to power a factory—to heat a home, a hospital or any other building? Then you should consider these important

ADVANTAGES OF BITUMINOUS COAL!

- ☆ **Lowest-priced fuel almost everywhere!**
- ☆ **Labor costs are cut with modern boilers and automatic handling equipment!**
- ☆ **Easiest and safest to store *of all fuels!***
- ☆ **Vast reserves make coal's supply dependable!**
- ☆ **Dependable supply assures price stability!**
- ☆ **A progressive industry strives to deliver an ever better product at the lowest possible price!**

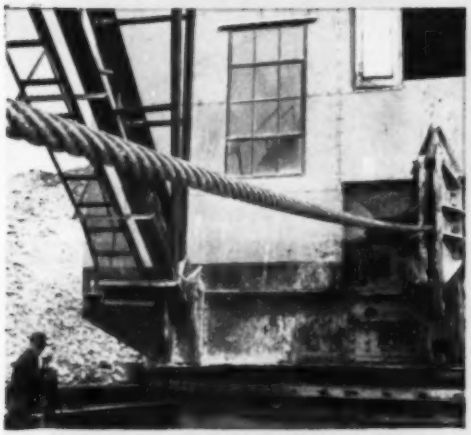
BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D.C.

FOR ECONOMY AND DEPENDABILITY

YOU CAN COUNT ON COAL!

The Proper Rope *plus* Proper Maintenance



This new Tiger Brand Drag Line Rope was designed especially to resist the extremely severe operating conditions encountered in this class of service. On one job where ropes lasted an average of 600 hours, this Tiger Brand Drag Line Rope was still going strong after 1100 hours—believe it or not!

Equals Longer Rope Life Lower Rope Costs

● Many prominent users of wire rope have found they can reduce wire rope costs as much as 50% by using a wire rope designed for the job. They get better rope service at lower rope cost by following this simple, job-tested system, with the help of the Tiger Brand Wire Rope Specialist.

Let this qualified expert make *sure* that you select, for each job, a wire rope that is strong enough to carry the load with an ample margin of safety . . . able to stand incessant flexing and sharp bending without failure of wires due to fatigue . . . built to take the most severe abrasion and crushing. Then make sure that every foot of wire rope you own is inspected, cleaned and lubricated *regularly*.

Engineers and contractors who follow this procedure tell us that they are getting twice — sometimes three times—the life they expected from Tiger Brand Wire Rope, plus greater safety for crews and equipment and freedom from rope-caused work stoppages, all of which means important money savings.

When you are in the market for wire rope, make full use of the engineering knowledge of an expert who has made a life-work of analyzing and solving wire rope problems. Just drop us a line and your Tiger Brand Wire Rope Specialist will be glad to consult with you. Meanwhile, why not send in the convenient coupon for a copy of our latest book?

More than a million tons of oyster shells have been converted into chemicals at this plant. The owners have found that Tiger Brand Wire Rope stands up best under these severe abrasive conditions, cutting rope costs, reducing down time and keeping equipment at top capacity.

SEND FOR THIS NEW BOOK. It contains specification data that will help you select the right rope for each application. In descriptive text, illustrations, diagrams and tables, it gives you complete information on types of rope, diameters, working loads and safety factors for all sorts of rope service.

American Steel & Wire
Rockefeller Building, Dept. J-8
Cleveland 13, Ohio

Please send me your new book, "Specification Data, Tiger Brand Wire Rope."

Name.....

Company.....

Address.....

City.....Zone....State.....

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

Whatever your fuel picture,

there's a B&O coal to fit it!

• In the Baltimore & Ohio area lies a treasure-land of Bituminous—an almost inexhaustible source of low-cost heat and energy. Here are found Bituminous coals *of all varieties*—for power, for coking, for steam, for space heating.

B&O coals are excellent for generating steam in utility and industrial power plants, for steel mills, malleable iron plants, gas plants, lime and brick kilns, cement and glass plants, and potteries.

Whatever your "burning need," Industrial or Domestic, there's a B&O coal to meet it—and we are ready to help you find the best for your purpose. Just *ask our man!*

BITUMINOUS COALS
FOR EVERY PURPOSE

LINKING 13 GREAT STATES WITH THE NATION

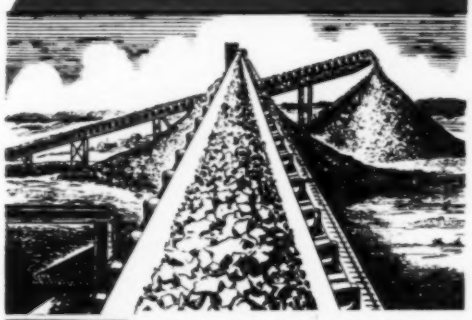
BALTIMORE & OHIO RAILROAD

Constantly *doing things*—**better!**

This new

CONVEYOR BELT

gives you everything you want . . .



RAY-MAN "F" CONVEYOR BELT

Users asked for a conveyor belt to stand up where there is exceptional tendency to tearing or puncturing . . . where pulleys are relatively small . . . and yet where only a thick, narrow belt could be used. It must hold fasteners better too. R/M engineers solved this combination of tough problems with Ray-Man "F", the new conveyor belt using unique properties of synthetic fibre strength members • Ray-Man "F" also gives you everything you ask for in a general purpose belt — troughability, flexibility, resilience for shock loading, better cover adhesion. It naturally follows that you get longer service than you ever thought possible in a conveyor belt • Bulletin 6915 describes it fully. Write for your copy . . . The R/M representative can show you equally good engineering in R/M hose, transmission and V-belts.

RM

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

FOR TOUGH GOING

Even when the going gets tough—with rough ragged holes, rugged terrain, continuing rains, flooded pits — Primacord comes through with plenty of good digging. For there's a grade of Primacord to meet every blasting condition—*Reinforced* for very deep holes requiring high tensile strength; *Wire Countered* where there's high abrasion; *Plastic Reinforced* where water or acids are present.

The men like it, too. It comes in convenient spools; it's light in weight; easy to hook up for main and down-hole lines — just tie a half hitch — and it's safe to handle.

Primacord is not affected by stray currents nor can it be set off by friction, sparks, or ordinary shock — it requires a blasting cap to detonate it.

Under all conditions it pays to

"Hook Up and Detonate with PRIMACORD"

Ask your explosives supplier
or write us direct for further facts

THE ENSIGN-BICKFORD COMPANY
SIMSBURY, CONNECTICUT
Also Safety Fuse since 1836

Made in several types. **PLAIN PRIMACORD** for shallow holes and surface trunk lines; **REINFORCED PRIMACORD** for deep holes and resistance to abrasion; **WIRE COUNTERED PRIMACORD** for deep, ragged holes; and **PLASTIC REINFORCED PRIMACORD** for deep, wet holes and river crossings.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

AUGUST, 1952

IVAN A. GIVEN, EDITOR

Equally Important

PERHAPS someone somewhere—aside from Mr. Lewis—is quietly working on the lines to be followed in negotiating the next wage agreements. Other than this, 1952 so far has been distinguished by a state of calmness that borders on indifference—or perhaps numbness is the better word. And with no visible indicators of things to come, prognostication as to what developments may be is even more difficult than usual. But falling back on what one fondly hopes is logic, the following are some surmises on attitudes and actions when the curtain goes up.

Lewis will demand, among other things, a substantial wage increase or a shorter day, perhaps with a smaller increase. He also will demand an increase in welfare-fund payments. He will get part of his demands—possibly an increase equal to that granted by steel or a shorter day.

He will get these concessions because the government is now engaged in screwing up the wage level again and the public has been conditioned to another round of concessions to unions. And unless management is prepared to present and maintain its case, Lewis could get even more though his position is somewhat weaker in some respects that it has been in the past. Consequently, management must be prepared to do the best-possible negotiating job.

Is negotiating an agreement, however—important as it is—the last word in attaining effective management-miner relations? Is work at the mine level equally or perhaps even more important? A grassroots study by *Coal Age* shows definitely that it is. What *Coal Age* found is summarized in the special report elsewhere in this issue, along with the tested methods that are being employed to create harmony and cooperation. The benefits certainly warrant greater effort and wider use of these methods.

Still Clearer

RAILROADS continue to dieselize. The President's Materials Policy Commission, in its June, 1952, report on "Resources for Freedom," points out that the United States is depending more and more on foreign oil supplies. Russia continues to build submarines. Is there a lesson—or a warning—in these three apparently unrelated statements? The answer is of course "Yes."

It is becoming still clearer that growing oil use and imports are putting the United States in a position where it could be hurt severely if ocean oil movement was cut off. The answer is a realistic fuels policy that will reserve oil for critical uses or provide a satisfactory alternative source of supply within the Nation's borders. That means coal first and synthetic fuel from coal second.

Mining the Key

THE MOST for his dollar is the test that coal purchasers, as well as all other commodity buyers, use whenever they have a chance. Coal in 1952 is again being reminded rather forcibly of this basic economic fact. Salesmen are having a tougher time and they need the utmost in support. Efficient mining is the key, since efficient mining strengthens the salesman's hand by providing him with that most-powerful competitive weapon of all—low prices based on lowest-possible cost.

Perhaps many men at the mines do not realize fully that this puts it squarely up to them. This should not be cause for alarm but rather should be greeted as an opportunity. With a real stimulus, a harder search for cost-cutting possibilities will reveal opportunities guaranteeing a solid future.

MODERNIZATION BACKBONE at Roslyn-Cascade is this low-type continuous miner installed for both development and room work in coal pitching 9 deg. Miner completed in 4 mo development that would have taken 1 yr previously.

Low-Type Miner—New Life for Roslyn-Cascade

SHAKER CONVEYOR takes coal from continuous miner operating both across and up the pitch at Roslyn-Cascade.

SHAKER discharges coal to cars for trip to the surface. Mine uses shortwall cutters and air drills.

CONTINUOUS MINING of coal pitching 9 deg and modernization of surface plant and underground facilities, with stress on safety, put new life into Roslyn-Cascade, helping it fight increasing costs and competition.

Continuous Mining on 9 Deg

Development with low-type continuous miner served by shaker conveyors saves $71,000 in 4 mo. Equal savings expected in room-and-pillar work. Modernized mining and preparation gives property new lease on life.

By WARREN E. CRANE
Seattle, Wash.

WITH THIN COAL pitching 9 deg and carrying a shale band, the Roslyn-Cascade Coal Co., Ronald, Wash., has found the answer to a difficult mining and marketing problem in a modernization and mechanization program embracing both the mine and surface plant. A major factor in the program was the installation, in March of 1951, of a low-type continuous miner, which saved $71,000 in 4 mo by materially speeding up development and is expected to yield equally good results in room work, in which it is now engaged in accordance with the original plan.

Although already equipped with shaker conveyors underground and mechanical-washing facilities on the surface, the company has been experiencing increasing difficulties as a result of reduced markets brought about by oil, gas and hydro competition, high labor cost, rising equipment and materials prices, and mounting taxes, in addition to the natural conditions previously outlined.

Kennell-Ellis, Seattle

HARRY S. PATRICK, president and son of the founder, sparked Roslyn-Cascade program for better mining.

These difficulties, in fact, had led the board of directors to vote for closing the mine. However, Harry S. Patrick, then vice president, insisted on continuing operation for a number of reasons. One was that the property had been created by his father, who was a member of the original discovery party. Another was concern for the old and faithful employees and for the community, which was almost completely dependent upon the mine.

MODERNIZATION THE SOLUTION

With a high-quality coking coal to draw upon, Mr. Patrick felt that the property could continue to produce

and more than break even if the plant was improved and new equipment could be installed underground to improve the mining cycle. After the other directors retired from active management, he became the new president and embarked on a program designed to put new life into the property.

One of the first steps was to acquire the continuous miner—A Joy 3-JCM low-type unit—thereby making it possible to develop more efficiently and stay ahead of retreat mining of rooms and pillars. Installation of the miner was accompanied by new power equipment and other underground facilities, and the addition of a storage bin, centrifugal drier and other equipment to the surface plant for improving the efficiency of the preparation process, and thus make possible better service to consumers in the Pacific Northwest via both the Northern Pacific Ry. and motor trucks.

Installation of the miner in coal pitching 9 deg and under the conditions encountered in the operation confronted Mr. Patrick with a hard decision, in view of the expflense involved. The decision was preceded by inspection of miner operation in Pennsylvania and a thorough study of possibilities at Roslyn-Cascade. Installation and initial instruction of the mine staff and operating crew, including Joseph M. Starcevich, superintendent and mine foreman, and Jack Hendry Jr., Robert and Jack Pasquan, and Robert Kozelishy, was handled by Jim Sarvis, of the Joy service department.

Other members of the Roslyn-Cascade staff contributing to the success of the modernization program include Harold Browitt, master mechanic Bror Lindberg, in charge of the preparation plant and outside foreman; John Briggs, chief electrician; and Joe Kozelishy and Wm. Fera, assistant foremen. E. G. Richards, superintendent at Roslyn-Cascade for 25 yr and now retired because of ill-health, was responsible for much of the original planning and mine layout.

MINING BEGAN IN 1898

The present Roslyn-Cascade mine is No. 4 in the 53-yr life of the company. The history of the field dates back to 1886, when a party sent out by the Northern Pacific Ry. to prospect for fuel discovered coal in the Roslyn area. Party members were Archibald Stewart Patrick, Tom W. Fleming, William Anderson, Harry Cottell, William Thompson, Archie Anderson and, in charge, Harry Graham.

Ros'lyn-Cascade was incorporated in 1905 by C. X. Larrabee, Cyrus Gates, William Mackay and Archie Patrick. However, Mr. Patrick had opened a small mine on the present property in 1898. With the passage of the founders, the company was continued under the direction of Charles Larrabee, Cyrus K. Gates Jr. and Harry S. Patrick, all sons of the founders.

The present No. 4 mine is producing from the Plant No. 6 seam, 40 to 46 in thick and dipping, as noted, 9 deg in a southerly direction. The main bed includes an average of 6 in of shale, with 18 to 20 in of bony coal above the seam.

The mine was laid out for room-and-pillar operation, and main openings include a 2,480-ft rock drift driven on a 2% rising grade to the coal and service openings on the opposite side of the ridge from the preparation plant. Others are a 340-ft 45-deg rock slope serving as the ventilation inlet, two 4,800-ft coal slopes and two airways 2,000 and 2,200 ft in length. The slopes serve the 5 East and 4 West entries, which are the farthest working entries from the outcrop. Under development, also, are the 4 East and 3 West entries.

With room-and-pillar as the basic plan, No. 4 mine was developed by the aforesaid coal slopes, consisting of pairs of headings, and by crosspitch entries, also made up of two headings, one a haulway and the other an airway. The room entries were driven at intervals ranging from 250 to 400 ft, and connecting airways were cut through after they had been turned.

Both slopes and entries were driven 26 ft wide on 300-ft centers. For height in the haulage openings, the top was brushed to a height of 7 to 8 ft. Material removed in brushing was taken outside.

Rooms were turned up the pitch on 50-ft centers and were driven 30 to 40 ft wide. Mining equipment includes shortwall cutters, compressed-air drills and shaker conveyors. Two of the latter, equipped with duckbills, were used for development prior to the installation of the continuous miner. Extraction averages 85%. The mine is classed as gaseous by the Division of Mining Safety, Washington Department of Labor and Industries, and all equipment is permissible, with shaker-conveyor drives installed on intake air.

Systematic timbering was an early rule in Roslyn-Cascade operations, including No. 4 mine. Posts with cap pieces are aligned on approximately 4-ft centers. Safety jacks were used at the face with the duckbills, and timbers are kept within 6 ft of all other working faces. Brushed openings are timbered as necessary and frequent roof tests are made by both miners and officials.

MINER DEVELOPMENT

The Joy continuous miner went into service in No. 4 mine in March, 1951. Its first job was driving crosspitch entries and necking rooms. Enough experience has been gained in the latter operation to indicate to the management that the machine will provide equally good results in room work up the pitch.

Headings and airways are driven 16 ft wide with the miner. The miner not only takes the coal but also removes the 6 in of shale and the 18 to 20 in of bony to the main top.

Rooms also will be driven 16 ft on 50-ft centers, with the miner working directly up the pitch. In room work, the shale and top bony are gobbed along the ribs by swinging the rear conveyor. Pillars possibly will be removed by turning the machine across them and following it with the shaker conveyors used in both entry and room work to carry the coal back to the mine cars.

The unit crew consists of the following: operator, two pannen, one man timbering, and one man at the loading spout of the shaker conveyor.

Average output in entry development, including the shale and bony, is 125 to 150 tons per shift. Development has been greatly speeded. In fact, the miner has been able to complete in 4 mo a mile of development work that would have taken a year with the methods previously employed, saving, as noted, $71,000 in the process.

The 250- to 300-ton average miner coal output per day of two shifts represents an increase of nearly the same tonnage in total mine output. With this aid, production in 1951 reached 85,000 tons with an average of 57 men underground and 23 on the surface. In comparison, output in certain earlier years was as follows:

	Tons
1947	117,300
1948	106,000
1949	76,000
1950	64,000

The increase to 85,000 tons in 1951 reflects not only some increase in coal demand, but also to a considerable degree the operating and preparation advantages contributed by the continuous miner and other new facilities both underground and on the surface. Among the advantages is a substantial improvement in roof conditions as a result of elimination of shooting.

Experiments were carried out with three types of bits during the installation period. With the SM-2 instead of

the SD-2, some improvement was noted in the coarseness of the coal. The SF-2 bit was then installed and materially increased the yield of coarse coal—a major advantage in that stoker is the company's most popular product.

Maintenance on the continuous miner has been low and there have been no serious breakdowns. In fact, the only replacements to date have been a high-pressure hose, cutting-head shaft and belts. A major reason for low maintenance is the employment of two mechanics—Jack Hendry Jr. and George Hendry—who overlap shifts, check thoroughly for lubrication, carefully inspect working parts and look after changing of the bits.

SAFETY A NO. 1 GOAL

Aside from the miner, other underground improvements include replacement of the steam engine on an underground hoist with a 300-hp G.E. motor and the installation of a new bank of Westinghouse transformers along with capacitors to raise the power factor to a minimum of 85%. Armored cable extends down the 45-deg air slope to the underground transformers stepping 2,300 down to 440 v AC. The cable is buried in the floor and the transformers are installed in well-ventilated fireproof rooms with fireproof doors. Cutout switches are located in each entry.

Good housekeeping and pleasant employee relations back up other safety measures that have kept fatalities down to four in the 53-yr history of the company, for a rate of 1 per million man-hours, and have limited non-fatal injuries to not over two minor ones per month. First-aid stations to minimize the effects of any injuries that may occur are backed up by the health-safeguarding features of a neat and sanitary wash-and-change house.

Other measures, in addition to those previously noted, for the reduction of hazards at Roslyn-Cascade include: fire-fighting facilities near electrical stations, careful testing for gas, good ventilation by a fireproof fan offset from the air slope, line brattices to working faces, permissible explosives and blasting units, well-constructed magazines for protecting explosives and detonators in working sections, removal of loose top, unobstructed clearance, locking devices for cutter bars, special safety couplings for mine cars, posting of signals at hoists, full use of trip lights (No. 4 mine first in the state to install them), good insulators and well-installed power wires, machinery guards for all equipment, safety shoes, approved-type goggles for eye-hazardous work (provided by the company), safety stations on all slopes and special man-trip cars.

A first-name basis for relations between management and men stimulates cooperation in both production and safety and is a major reason for the company's success in retaining its men, in spite of financial and other inducements from outside industries.

SURGE BIN AND DRIER RAISE COAL QUALITY

The Roslyn-Cascade organization has long been a believer in providing its customers with the best possible quality of coal. In line with this thinking, a McNally-Norton washer was installed in 1937 and has been followed by a long series of other improvements. The latest include a 400-ton surge bin to enhance washing results by smoothing out the feed rate, and a McNally-Carpenter centrifugal drier to reduce the moisture content of the stoker size.

The preparation process at Roslyn-Cascade is based on preliminary screening to split the coal into plus and minus 1⅝-in fractions. The coarse and minus 1⅝-in are washed and dewatered, including use of the centrifugal unit to achieve maximum removal of moisture from the stoker.

Sizes normally prepared are: 1⅝x¾, ¾x¼, 1⅝x0 and ¾x0. All sizes can be dustproofed with oil.

To enhance the efficiency of the washing unit it was early equipped with automatic controls over refuse discharge, thus maintaining the depth of the refuse bed at a predetermined level most conducive to best results. Rate of refuse discharge also is controlled to prevent disturbance of the washing bed. In addition, the washer is equipped with a "start-stop" control, which automatically cuts off the air pulsations when the coal flow stops and starts them again when it resumes —still another step toward maintaining a stable washing bed. If desired, the ash content of the final product can be changed by moving a counterpoise on a graduated balance beam, in turn changing the position of the floats governing the depth of the washing bed.

Automatic rather than manual control results in uniform quality of the washer product regardless of changes in the refuse content of the raw feed, such as, from 10 to 20% in a relatively short period of time. With the 400-ton surge bin as a reserve between mine and plant, and the "start-stop" control, fluctuations in feed rate that might also interfere with washing results are eliminated. Installation within the past year of a 150-tph Link-Belt bucket elevator to supply the bin with coal has further increased the ability of the surge bin to contribute to more efficient washing.

In addition to its other activities, Roslyn-Cascade takes pride in the fact that it manufactures 95% of the parts for its various machines and makes 99% of its own repairs. Manufacturing and repair are facilitated by complete machine shop. Equipment in the shop includes, in addition to machine tools, welders and the like, all the necessary hand tools and facilities for handling both parts and mining equipment.

★ ★ ★ ★ ★

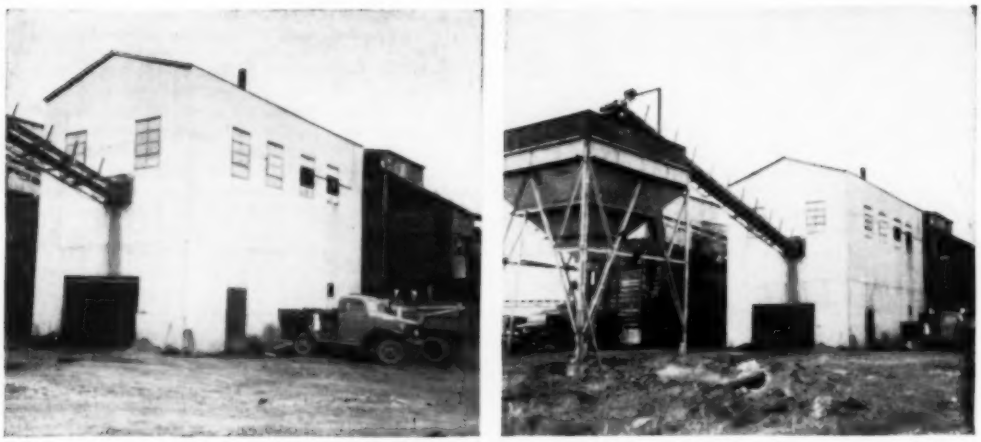
How Would You Have Handled It?

I took a new job a while back as superintendent and when I got there I found I had a tough pit committee. They really poured it on me, and of course most of their grievances were purely imaginary. I got nowhere in trying to reason and they were beginning to get me down, when an old timer gave me a thought that got me out of the difficulty pretty well.

How would you have handled it?

As a result of the old-timer's suggestion, I made out a list of grievances of my own—and it was a good list, too, because the men were taking their cue from the committee and were slack all around. I called them in instead of waiting for them to call on me. That alone was enough to let me get my foot in and I didn't let them get set before I started in with my list. I had facts they couldn't argue away. It worked because I was right and because it gave them something new to think about—the fact that giving wasn't all one-sided and cooperation is the best all-around bet.

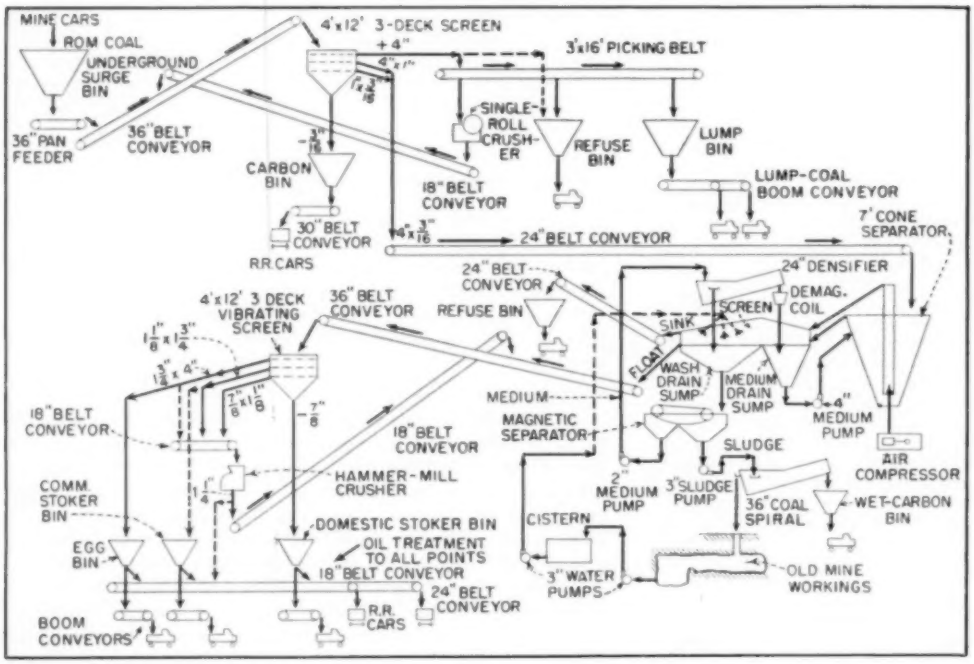
★ ★ ★ ★ ★



DESIGNED FOR PRECISION WASHING of 4 x 3/16 with minimum water, new Belle Valley heavy-media plant was installed in 8 wk. Right rear is old tipple; left rear, clean-coal sizing and loading; foreground, refuse bin.

How Heavy-Media Preparation

Compact plant for 4 x 3/16 insures precision washing to expand market, provides high recovery and uses a minimum of water



HERE'S THE WAY new heavy-media plant fits into the Belle Valley preparation system.

SLOPE BELT brings coal to surface from underground hopper receiving coal from drop-bottom cars. Crushed ROM or bone pickings may be returned to recirculating hopper (right), over the slope belt at ground level.

Broadens Belle Valley Market

By KENNETH WALL
Superintendent, Belle Valley Coal Co., Belleville, Ill.

HEAVY-MEDIA CLEANING has opened up a broad new market for the Belle Valley Coal Co., in addition to providing precision treatment at minimum cost. Operating on 4x3/16 coal, the plant was selected to provide a high recovery, to fit into a limited area, and to use a minimum of water.

Belle Valley operates on the outskirts of Belleville, St. Clair County, in southwestern Illinois. The plant lies just off U. S. Highway 15 and is served by the Louisville & Nashville R.R. The seam is the Illinois No. 6—also known as the Herrin Bed—and is the typical high-volatile bituminous-rank coal produced in the southwestern Illinois coal fields.

Belle Valley operations started in 1939 and continued for 10 yr on the basis of production of raw coal for the market. Toward the end of this period it became evident that there was a diminishing demand for the unwashed raw coal. In fact, the situation became so serious that the company's production was barred from the St. Louis market, where only washed coal was acceptable. Hence the decision was reached early in 1949 to install a modern washing plant and improve general surface operations. Here is a review of how Belle Valley achieved the desired results.

FACTORS IN PLANT DESIGN

Concentrated investigations were made into the washability of the coal and this information, together with local operating factors of ranking importance, established the following conditions:

1. The type of washer chosen would have to be highly efficient and designed for simple operation.

2. The washer yield would have to be high because of tight-disposal-area conditions.

3. A limited water supply dictated fairly low water consumption in the washer.

4. Limited surface area was available for washing-plant installation.

With the above factors in mind several types of washers and washing processes were investigated and the decision was reached to install a Wemco Mobil-Mill, as manufactured by Western Machinery Co., for the obvious reason that this type of prefabricated heavy-media separation plant best met the above conditions. Accordingly, plant facilities were ordered and construction was started July 1, 1949. Excellent supervision and a good construction crew made possible quick completion of surface improvements so that washing operations could begin only 8 wk later.

CRUSHING AND SCREENING

Run-of-mine coal is dumped from 5-ton drop-bottom cars into a 70-ton underground surge hopper. Hopper discharge is to a 36-in pan feeder connected to the tail pulley of a 36-in-wide 432-ft-long slope belt on a 15-deg inclination. The conveyor discharges the ROM coal to a dry-operated 4x12-ft triple-deck vibrating screen, equipped respectively with 4-, 1- and 3/16-in wire-cloth openings.

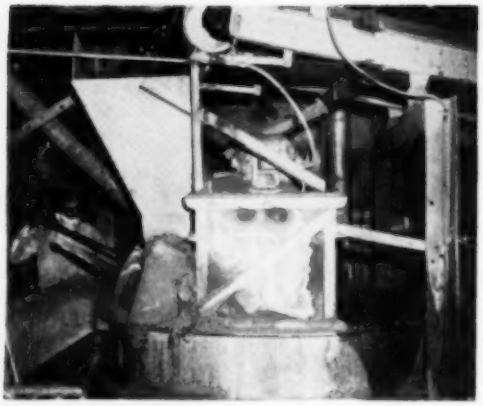
The plus 4-in lump is treated in one of two ways, depending on market conditions. It may pass through a 24x30 single-roll crusher which discharges back to the slope belt, or it may be sent to a hand-picking belt where free refuse, bone and lump coal are sorted out. The refuse is discarded to a waste bin, the bone is recrushed and returned to the slope belt, and the lump coal goes to a 60-ton bin equipped for truck loading.

The minus 3/16-in dry carbon from the triple-deck screen drops directly into a 100-ton bin for loading into trucks or railroad cars, as desired.

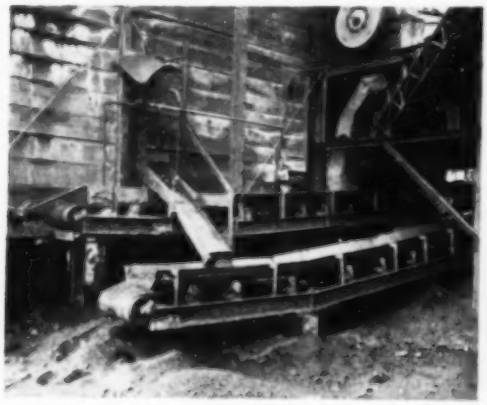
The 4x3/16 raw coal from the triple-deck screen discharges to a 24-in conveyor belt which feeds the heavy-media washing circuit.

Dry screening, when operating the picking belt, is typified by the follow-

FINAL SIZING on 4 x 12 vibrator produces 4 x 1¾ egg, 1¾ x 1⅛, 1⅛ x ⅞ and ⅞ minus for loading or crushing.



HEAVY-MEDIA CONE, 7 ft in diameter, receives 4 x 3/16 from 24-in raw-coal belt.



BLENDING CONVEYORS receive cleaned coal for railroad loading at Belle Valley.

TRUCK-LOADING FACILITIES include boom conveyor from storage bin. Coal is oil-treated as desired.

ing weight distribution of products:

Product	*TPH*	*Per Cent Weight*
Run-of-mine	90	100
Plus 4-in picked lump	21	23
Refuse	2	2
Minus ⅜ in carbon	10	11
4x⅜ in Mobil-Mill feed	57	64

HEAVY-MEDIA SEPARATION

Separation of sink and float products is accomplished in a 7-ft-diameter Wemco heavy- media-separation cone separator, operated at a gravity of approximately 1.50, depending on product requirements. The medium used is Grade C magnetite. The 4x⅜ in from the 36-in belt conveyor is fed dry to the cone. The refuse, or sink, is continuously removed by an 8-in-diameter internal airlift discharging to the product-drainage screen. The cleaned coal, or float product, overflows the cone weir and also passes to the product-drainage screen.

PRODUCT DRAINAGE

The coal and refuse from the cone discharge to a 4x16-ft Allis-Chalmers Low Head vibrating screen having longitudinally separated sections for media drainage of the two cone products. The screen is equipped with stainless-steel cloth having an equivalent opening of approximately 10 mesh. Medium draining from the coal and refuse during the first 4 ft of screen travel is returned directly to the cone by a 4-in Wemco medium pump. This accomplishes 80 to 90% recovery of medium for re-use without dilution. The remainder of the medium, adhering to the coal and refuse, is removed by water sprays during the remaining 12 ft of travel over the drainage screen.

When operating the heavy-media plant at 1.50 sp gr, 91% of the cone feed reports as cleaned coal and passes from the drainage screen to a conveyor belt for product sizing, as described below. The remaining 9% reports as refuse and passes to a 24-in conveyor belt discharging into a 200-ton refuse bin for truck disposal.

MEDIUM RECLAMATION

The diluted medium from the washing section of the product-drainage screen flows by gravity to a 24-in belt-type Wemco wet magnetic separator for recovery of magnetite. This operation eliminates excessive water, slime and fine non-magnetic foreign material, preventing their return to the cone separator. The cleaned magnetic concentrate is then pumped by a 2-in Wemco medium pump to a 24-in-diameter Wemco densifier.

Sludge and foreign material from the magnetic separator is pumped by

a 3-in Wemco pump to a 36-in Wemco coal spiral. The coal spiral accomplishes a wet size separation at approximately 65 mesh. The plus 65-mesh fraction goes to a wet-carbon bin for disposal by truck. The minus 65-mesh fraction, or overflow from the coal spiral, passes by gravity to an old section of the mine where the solids settle out and the clarified water is returned for plant re-use. Total water circulated is 200 gpm, of which 15 gpm is new makeup water.

MEDIUM STORAGE AND RETURN

The densifier further dewaters the cleaned magnetite and serves as a storage vessel for returning the medium to the cone separator. By raising and lowering the densifier spiral mechanism the quantity of medium returned to the cone separator can be carefully regulated. The densifier discharges the medium by gravity through a demagnetizing coil which in turn discharges into the 4-in Wemco medium-pump sump for return to the cone separator. The demagnetizing operation is essential for deflocculation of the magnetized medium. The demagnetized medium makes for proper viscosity and accurate gravity control in the cone separator.

MEDIA CONSUMPTION

The Grade C Magnetite is purchased in 100-lb bags prepared for use and, as required, is fed dry to the Wemco densifier pool where it receives thorough wetting prior to being fed to the cone separator. Consumption of magnetite averages 0.67 lb per ton of coal fed to the cone separator, or well under 0.50 lb per ton of ROM coal. The type of magnetite used in any heavy-media circuit is highly important and the following screen analysis indicates the specifications of the Grade C magnetite now being used at the Belle Valley plant:

Mesh	*Range, Per Cent Weight*
Plus 65	0.1–0.5
Plus 100	1–5
Plus 150	10–20
Plus 200	15–20
Plus 325	20–25
Minus 325	40–50

CLEANED-COAL SIZING

The 4x⅜ cleaned coal from the product-drainage screen is delivered by a 36-in conveyor belt to a 4x12 triple-deck vibrating screen equipped with 1¾-, 1⅛- and ⅞-in wire-cloth openings. The 4x1¾ egg coal either passes directly to a storage bin or is crushed in a hammermill. The intermediate 1¾x1⅛ always passes through the same hammermill. The 1⅛x⅞ either passes through the hammermill or is sent to a commercial-stoker bin. The minus ⅞ goes to a 100-ton domestic stoker bin. The hammermill product, nominally minus 1¼-in, is either returned to the 36-in cleaned-coal conveyor for regrading or is loaded directly into railroad cars as screenings.

All bins are equipped with truck-loading conveyors and rail-car loading conveyors. Coal as discharged from the conveyors is oil-treated to meet market requirements.

WASHING RESULTS

Table I is indicative of results being obtained in both hand-picking and heavy-media operations at Belle Valley. All analyses are on a moisture-free basis.

Samples of coal and refuse taken when the cone separator was operating at 1.49 sp gr were fractionated in heavy liquids to obtain the results shown in Table II, all on air-dry basis.

Items 1 and 2 in Table II illustrate washing efficiencies of the Wemco Mobil-Mill heavy-media separation circuit. The misplaced sink material in the cleaned coal is 0.5% by weight, whereas the misplaced float material in the refuse is 2.3% by weight. Hence the washing efficiency may be based on total percentage of "misplaced error material," or 2.8%. Operating personnel consider this figure to be quite satisfactory from the viewpoint of size of operation and general washability of Illinois No. 6.

WASHING COSTS

Over-all coal-washing costs approximate 22¢ per ton of coal, including costs for labor, power, maintenance, media and general overhead.

Installation and operation of the washing circuit previously described fully meets the originally proposed Belle Valley requirements. The market demands resulting from the washed-coal products has placed the company in an enviable position in the district. At the time this information was being prepared, plans were well under way for plant expansion to meet anticipated increases in market demands.

Table I—Cleaning Results at Belle Valley

Product	Per Cent Ash	Per Cent Sulphur	BTU Content
Minus ¾ dry carbon	25.1	4.0	10 090
4-in handpicked lump	12.9	4.8	12,350
Mobil-Mill cleaned coal:			
4x2	10.01	3.99	12,431
2x¾	9.67	4.00	12,545
¾x⅜	9.68	3.76	12,410
Refuse	61.21	....	.....

Table II—Washing Efficiency at Belle Valley

Clean Coal (Float)

Product	Weight %	Weight % Cum.	Ash %	Ash % Cum.	Sulphur %	Sulphur % Cum.	Moisture
Float 1.35	78.2	78.2	7.36	7.36	3.25	3.25	5.31
Float 1.40	13.9	92.1	13.54	8.30	3.76	3.33	5.31
Float 1.45	6.3	98.4	17.68	8.90	5.64	3.47	4.83
Float 1.50	1.1	99.5	22.95	9.05	5.67	3.49	4.73
Sink 1.50 (1)	0.5	....	27.87	....	6.86	....	3.96
Sink 1.55	0.0	....	....	....	....	....	....
Total	100.0	....	9.13	....	3.51	....	5.27

Refuse (Sink)

Product	Weight %	Weight % Cum.	Ash %	Ash % Cum.	Sulphur %	Sulphur % Cum.	Moisture
Float 1.45	0.0	....	....	....	....	....	....
Float 1.50 (2)	2.3	2.3	23.50	23.50	7.01	7.01	3.91
Float 1.55	7.7	10.0	23.77	23.6	9.80	9.1	4.54
Float 1.60	5.7	15.7	26.68	24.8	10.00	9.4	4.64
Float 1.65	8.6	24.3	36.25	28.8	6.40	8.3	3.32
Float 1.70	3.0	27.3	38.65	30.0	8.02	8.3	3.15
Sink 1.70	72.7	....	64.24	....	11.30	....	3.54
Total	100.0	....	54.86	....	10.49	....	3.71

IN A GANGWAY, Mr. Morris (right) emphasizes the importance of good timbering and adherence to standard timbering plans. Joseph Zimmie (left), the miner driving the gangway, is a member of Eddy Creek's safety committee.

A Day With a Safety Supervisor

CHARLES E. MORRIS, one of Hudson Coal Co.'s safety inspectors, comes to his job equipped with 21 years' experience as an anthracite section foreman, a period that saw no lost-time roof-fall injuries in his section. A *Coal Age* camera and notebook spent a day with Mr. Morris in the company's Eddy Creek mine to find out more about (1) this notable record of safe supervision, (2) the Morris methods by which the record was achieved and (3) how the company now utilizes Mr. Morris' talents for promoting safety among all production supervisors and employees.

THE MORRIS RECORD—"AMAZING"

SUPERVISING a working force that averaged 60 men through almost 2¼ million man-hours of exposure to typical anthracite mining conditions without a roof-fall injury is an amazing record. That's what Pennsylvania's former governor, Edward A. Martin, said at Harrisburg, Nov. 26, 1945, when he presented Mr. Morris with an appropriately engraved flame safety lamp in recognition of his safety efforts.

To have supervised this working force in producing more than 1,200,000 net tons of anthracite in approximately 4,800 starts without roof-fall injuries "seems almost outside the realm of what is possible." That's what Dan Harrington, former chief, health and safety branch, Bureau of Mines, said May, 1945, in a letter to Hudson Coal's safety department. Mr. Morris holds six Certificates of Honor awarded by Joseph A. Holmes Safety Association.

What were the mining conditions in his section from March, 1922, when he became a section foreman to May, 1946, when he was promoted to his present position? Well, at Miles' slope, a part of Olyphant Colliery, six gassy veins which ranged in thickness from 30 in to 10 ft were mined. Some were level but others pitched up to 35 deg. Both machine- and hand-mining methods were used in solid and pillar coal.

So his 21-yr span (March 1925 to May, 1946) without coal- or roof-fall injuries, which included five consecutive years when no lost-time injuries of any type occurred, was not unduly favored by conditions.

In addition, Miles' Slope personnel, materially aided by the safety-minded men in Mr. Morris' section, won the 1944 Sentinels of Safety Trophy in competition with other anthracite mines. In that year, 96 men produced 106,513 tons in 314 working days with only 3 lost-time injuries

BEFORE THE INSPECTION, Mr. Morris talks over this matter of safety with James G. Muncie (right), mine foreman, Eddy Creek, and J. R. Lindsey, mine inspector, USBM.

AFTER THE TRIP through the section, Mr. Morris, Howard Parry (standing), section foreman; and J. P. Walsh, fireboss, plan the elimination of a safety hazard.

totaling 12 lost days. The record is more remarkable in the light of those 314 working days; during the war Miles' Slope worked a number of 7-day weeks.

MORRIS METHODS—NO MAGIC OR MIRRORS

Such is the bright record Mr. Morris built as a production supervisor, and our purpose in spending a day at work with him was to discover for our other readers his magic safety wand.

There isn't any! We found out that a 21-yr safety record is not achieved through the use of magic or mirrors. The "old standby" safety tools, so ably wielded by Mr. Morris, still are experience, keen observation, persuasion, dramatization, discipline and concern.

Now serving as a direct link between Safety Engineer Karl T. Miller's office and the men and officials at the company's collieries, Mr. Morris employs his talents, according to our observation, about as follows:

- **Experience** with mines and miners is the main source of his authority. With more than three decades of supervisory experience, the inspector has seen a lot and has assimilated most of what he has seen. He has heard all the excuses and will have none of them.
- **Keen observation** is a highly developed trait. After roof, ribs, timbering, roads, machines and ventilation had been checked, we thought the inspection was about completed. We forgot the miner's blasting cable, but Mr. Morris didn't. He looked into the condition of the cable, the condition and position of the miner's tool box and explosives box, and he noted whether the proper tools were at the face. He looked over safety goggles, headblocks, cap pieces, switchboxes, safety lamps and numberless other details and devices which contribute to safer mining.

You might think all this probing would be resented but the inspector presented the picture of a man who never before has had trouble with his men on this matter of safety and who doesn't expect any now. And all this was done without poaching the authority of the section foreman who, after all, is in full charge of his section.

- **Persuasion** is one characteristic of a safety inspector that cannot be identified in a one-day visit, but we have proof of Mr. Morris' persuasive powers in the pages of the April, 1939, issue of Hudson Coal's *Safety Commentator*. In the Thirties, the company backed a campaign to have all employees equipped with hard hats, goggles, hard-toed shoes and safety gloves. Who was the first section foreman to have his entire working force thus equipped? That's right, Charles Morris! Since the purchase of this safety clothing was not compulsory, you can wager with assurance of winning that the job was done by diligent persuasion.

"WELL DONE," SAYS GOV. MARTIN in 1945 lamp presentation to Mr. Morris. Richard Maize, Pennsylvania Secretary of Mines, agrees. Furthermore, in 1944 Mr. Morris and his men helped Miles' Slope win Sentinels of Safety Trophy.

ROOF AND GAS TESTS by the miner give Mr. Morris an opportunity to review proper testing methods and intervals with the men at the face. Smoke tubes (right) help Mr. Morris trace air currents at critical points.

• **Dramatization** is one of those special-purpose safety tools that may not be used frequently but are indispensable when they are needed. To illustrate, Henry H. Null, assistant superintendent, Olyphant colliery, and editor of the *Safety Commentator*, who arranged our mine visit, tells of instances when the inspector's safety message seemed to be taken lightly. "When that happens," says Mr. Null, "Charlie needs only a few minutes to create a picture of conveyors running full of blood. He carries a mental file of reports of actual accidents, so when he sees hazardous conditions he can cite real accidents that have been caused by those conditions."

The point is: The safety message must be made impressive. Therefore, it is proper for a safety official to use dramatic illustrations to drive the realization home. In promoting safety, the desirable ends to be gained justify dramatic means, if the examples are true case histories.

• **The discipline** which Mr. Morris tries to foster as a safety supervisor differs somewhat from that which he employed as a production supervisor. As a safety inspector, he emphasizes self-discipline among the unit crews. In other words, he tries to make the men realize their responsibilities for following to the letter the proved precepts of safe mining. In all the places we visited, Mr. Morris spent some time convincing each man that he was personally responsible for his own safety and that of his fellow workers. The miner's responsibility for the safety of his laborers was stressed and laborers were coached to help their miner detect hazards.

The record shows that as a production supervisor, Mr. Morris did not hesitate to send an unsafe worker out of Miles' Slope when such action was necessary. In many such instances, however, the inspector went one step farther. He has been known to visit the home of the disciplined worker after the day's work, and in the course of his visit the family would learn why the breadwinner came home early. Straightforward methods like this make the 21-yr record seem not only possible but quite probable.

• **Concern,** genuine and sincere, for the physical welfare of mineworkers is the inspector's prime motive. All his contacts with the men at work are on a personal basis. He makes it crystal-clear that he is not in their working place as a critic or fault-finder but as an extra pair of eyes to find hazards and another brain to shape ideas for eliminating the hazards.

Throughout our day with Mr. Morris, he demonstrated a small but revealing characteristic which we think is one mark of a successful safety supervisor. Of course, he carries a "little black book," and during the day he jots notes into the black book to assist him in preparing his final report. While he writes in the book there are no testing devices or other distractions in his hands. As a result, the book is a most legible diary of his work. We mention this because it illustrated for us the deliberate approach Mr. Morris takes toward his work. He is never guilty of trying to do two or three things at the same time.

HOW THE COMPANY BENEFITS

By making full use of Mr. Morris' talents, the company now spreads among all its employees the good safety methods learned during the 21 yr at Miles' Slope when roof-fall injuries ceased to be No. 1 menace.

The company, through its safety department, achieves considerable safety gains from Mr. Morris' work because the company policy under which he operates makes possible a close follow-up and quick elimination of the hazards he finds.

During the inspection, Mr. Morris and the accompanying section official discuss shortcomings as they come upon them. Many hazards are eliminated on the spot and plans for correcting the others are worked out. At the end of the day, the inspector prepares his report in triplicate to inform colliery officials, safety engineer and general manager of his findings.

Space is provided on the report form in which the section foreman describes his actions in correcting the shortcomings. This colliery copy, with the section foreman's actions noted and approved by the mine foreman and superintendent, is forwarded to the safety engineer and general manager for their information and action. It is then filed in the office of the safety engineer with the inspector's report to show that proper corrective measures have been taken.

These observations center on Mr. Morris because we spent our day with him. However, Mr. Miller's safety team also includes B. T. Jones, safety inspector, and Darius H. Thomas, ventilation supervisor—both equally wholehearted in their dedication to the idea that mining can be made safe if you work at it.

Coal Age

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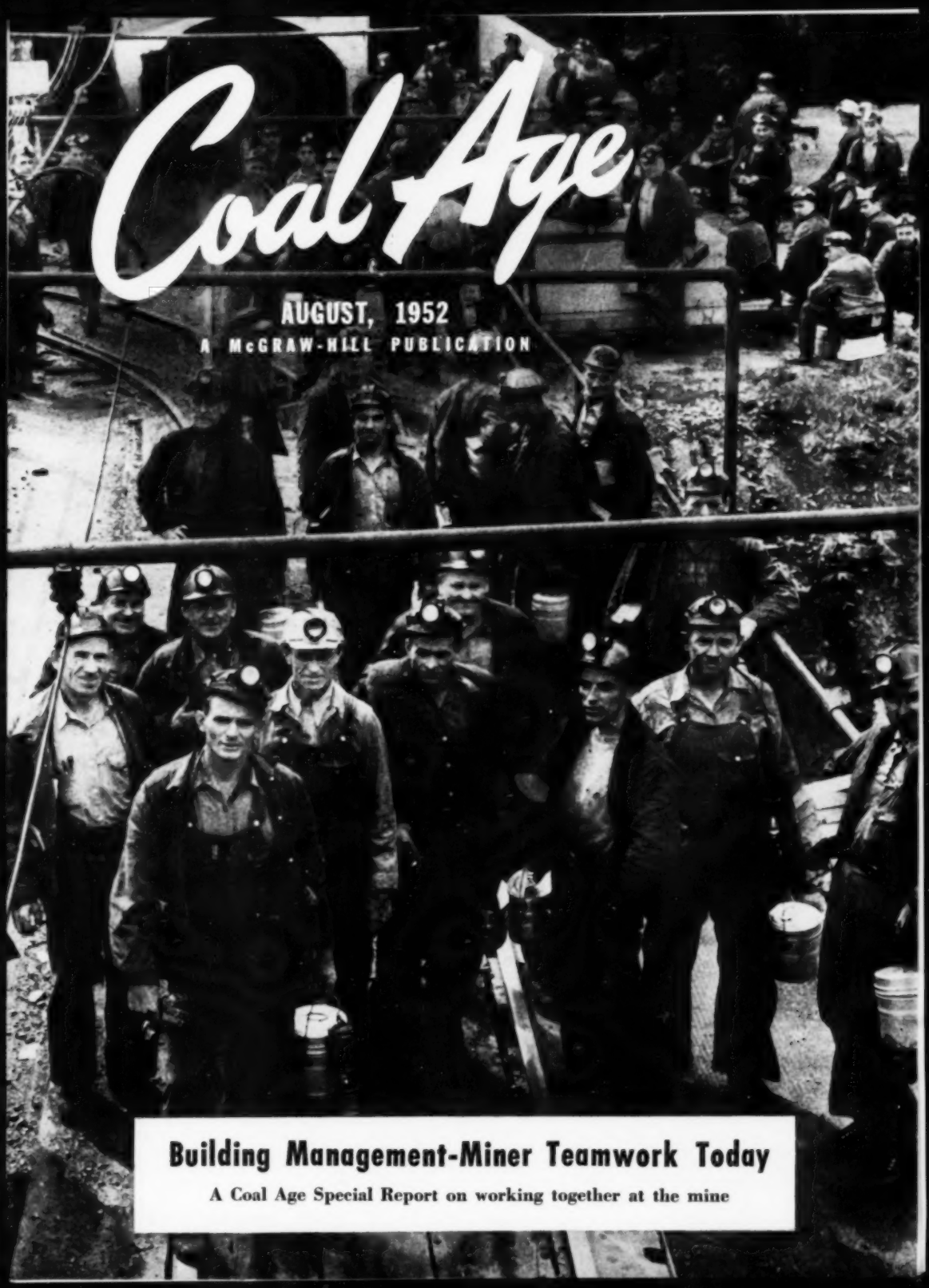


Building Management-Miner Teamwork Today

A Coal Age Special Report on working together at the mine

Building Today for Management-Miner Teamwork

At the mine — that's where labor management troubles hurt worst. It's where disputes arise. And it's where mining men must look to find the answers.

In this *Coal Age* Special Report, men who handle disputes at the mine talk about their troubles and triumphs and, in interviews and comment, tell their own stories.

They also pinpoint . . . roadblocks to mine peace . . . workable attitudes and tactics . . . fresh ideas that bring men together.

W. A. STANBURY, JR.
Associate Editor, Coal Age

CAN MANAGEMENT, MEN AND THE UNION get along on good terms at the mine?

What causes local disputes that shut mines down?

Is there any way to avoid local differences or minimize them?

At some mines and in some mining areas, management, workers and the union do get along. Pulling together, they iron out their differences on a friendly, constructive basis. Complaints are few. Grievances are fewer. And "wildcats" never—or almost never—shut down their mines.

But at other mines and in other districts miners, the union and management are at swords' points much of the time. Complaints grow into grievances, and grievances lead to harsh words, bitter feelings and sudden and frequent shutdowns.

Why the difference?

In the following pages, 13 men tell what they believe about labor-management relations, recount some of their experiences in dealing with people and issues, and offer their reasons why things tick along smoothly—or fail to tick smoothly—at the mine.

They are representative coal men. Among them are top officials of companies and the union, supervisors on various management levels, local mine committeemen and an operators' association official. They represent bituminous and anthracite, big companies and small, peaceful and embattled areas.

The stories these men tell, the principles they subscribe to and their expressions of hope and frustration came clear in across-the-desk and front-porch interviews with a *Coal Age* editor who traveled through the anthracite region, northern West Virginia and eastern Ohio seeking answers to the question: "What makes men and management get along peaceably at the mine?" Whether they talked about obstacles or achievements, these men talked freely and frankly.

The interviews were transcribed from notes and then were mailed to coal-company experts in labor relations. These men were asked for comment on the views and case histories revealed in the interviews. Here are the four men who sent in their comment, often pithy and always to the point:

Mr. A—An old timer at labor-management relations and safety in northern West Virginia. He's been in coal mining for 48 yr and with the same big commercial producer for the last 43 yr.

Mr. B—Also an old hand at labor relations and safety. He's with a "captive" company in western Pennsylvania.

Mr. C—An up-and-coming younger man specializing in training. He's with a major commercial producer in western Pennsylvania.

Mr. D—Another western Pennsylvanian. He's been with the same company since 1906; in the industrial-relations office since 1940.

The interviews, with the comment of the experts alongside, fill the pages that follow.

To get the picture on labor-management relations—the things that keep peace at the mine or make trouble, the tribulations and the triumphs of coal men and union men, the principles and tactics of getting along together—read on.

On-the-ground mining men pinpoint . . .

Attitudes and Actions That Keep Mines Running

1. Accept the fact that there are more reasons for working together than for pulling in opposite directions. Over the long pull, mineworkers, the union and management all are in the same business together. With this approach, immediate aims become easier to reach.

2. Abide by the contract. It's weak in spots but goodwill, understanding and honesty can make it work.

3. Resolve to compose differences when you approach the conference table rather than battle out the issues. That way, the odds favor peaceful and friendly settlements, with fairness all around. You needn't have a shutdown every time there's a difference of opinion.

4. Remember that men are men, and questions at issue always are colored by men's needs and ambitions. Thus success in labor-management relations hinges on tactics that are geared to the men involved.

5. Get the facts—all the facts. They're indispensable. They dissolve anger, break down prejudice and clear up the issues quickly.

6. Try fresh ways to improve your relations with others. New schemes, new ideas, new tactics may pull you out of the rut. All that's required is a little imagination.

7. Put yourself in the other man's place. From his standpoint, he may be as right as you are.

8. Be honest. When you see you're wrong, admit it. It's better to lose face temporarily than to lose your reputation for honesty.

9. Keep information flowing through all channels. There are many ways for management men to help union men, and many ways for union men to help management men. When you block information, you cut off opportunities to help and be helped.

10. Put men who deserve respect in key positions. That goes for management men who name supervisors and for union men who name representatives. Give the men in key positions the authority to do the job you expect of them.

Know your men . . . Remember the family
"Put yourself in a miner's place" . . . *Mine Superintendent*

Mr. C:

"The bituminous industry has its share of the usual labor-relations problems plus those occasioned by rapid mechanization."

We get along all right with the mine committee and the local union. When we do have a little dust-up it's likely to come from the older men. They remember wrongs and disputes from the days when things weren't so good, and some of them are still pretty bitter. That's why we work mostly on the younger committeemen. They've got good jobs and they know it, and we figure if we can keep them friendly, we'll make relations better for the future.

I always look for ways to contact our committeemen. The better I know them and the better they know me, the better we'll get along here at the mine. I look around for them and their wives and children at church suppers and club meetings and try to talk to them about things that are going on in town—street-paving, playgrounds and recreation halls for the children and teen-agers, and other things that affect the way people live in town. It's not all mine business, you see.

The father of two of our committeemen died a couple of days ago. I went around to the house to talk with the boys and their mother and offered them some company cars for the funeral. This afternoon there'll be three company cars to take people out to the cemetery. I also checked with some of the wives in the neighborhood to see that the family had plenty of food in the house without having to cook it.

I've got an idea. Would you like to have one of our committeemen write a piece about our labor relations? I think he'll put it on the line for you, and it'll give me a reason to contact him. I used to be a mine committeeman myself, and I know how I'd have felt if the superintendent had offered me a chance to write something for *Coal Age*. I'd have felt good.

Here in our company we think the answer to good labor relations lies with wives and children as much as with the men. That's why we do a lot of work in the community. We've built a fine recreation center in town and employed a woman as full-time director. The kids have a soda bar and ping-pong tables and they have dances pretty often.

We've had first-aid training for our miners for a long time. But when the Korean war broke out and Civilian Defense was set up, we opened our first-aid classes to the people in town. We've built up goodwill that way and we believe the people appreciate our efforts. I've learned to know a good many miners' wives and children.

It's not too hard for me to put myself in a miner's place and see things the way he sees them. I used to be a committeeman. When you put yourself in another man's place, things look different.

But you've got to be honest too. And it's not honest to promise something you can't deliver.

Mr. A:
"The employer has to make good on all promises made. Indefinite promises should not be made as they will be misconstrued."

We do all we can to tell our men what's going on. That includes the mine committee and the safety committee. We always talk over repeater accidents with the safety committee. Often we work out a transfer for a man who has one accident after another. We also tell the mine committee about changes we expect to make in mining methods, switching men and putting in new machines.

We don't have many complaints. Those we do have are mostly about hours, rates and classifications or about working conditions, especially safety. We have very few discharges, but when we do have one we make sure we have all the facts before we move. Even on safety we don't have any real trouble to speak of. The men are pretty good about safety practices and they don't pick up picayune things to complain about.

We find we can settle most questions right on the spot. Once in a while the safety committee gets a little out of bounds. Not long ago, for instance, they complained about a broken window in the preparation plant—said it caused a draft. That really was a matter of housekeeping, not safety. But we repaired the window right away.

From where I sit, my job comes down to this: I sell my skill and experience to the company for what they'll bring. In exchange, I'm expected to produce coal and make money for the company. I can't do my job and the company can't make money if our men are dissatisfied and always interrupting production with strikes. That's why I try to keep things smooth and friendly at the mine. I think we're succeeding pretty well.

Be fair . . . Stick to contract
"We need cooperation" . . . *Mine Committeeman*

I'm a committeeman who is elected by the union members at the mine. It is my responsibility to bring smoother labor relations at the mine. By this, I mean I help iron out disputes between the union men and the company bosses.

I don't find it difficult to get along with non-union bosses, although many times we disagree on the many grievances of the men. Probably what we committeemen need most is more cooperation from mine officials. We find that the foremen are inexperienced.

Mr. B:
"This works both ways."

A committeeman has a right to expect his company to be fair—to hire bosses capable of holding men's lives in their hands.

Mr. D:
"First and most important, we need foremen who are honest, fair and capable of expressing themselves in good English."

It is up to the company to keep their agreement with the men.

A company in turn has a right to expect their men to live up to their contract.

If the company doesn't agree with the wishes of the men and we committeemen can't settle the grievance, the grievance is then taken to the Conciliation Board and settled with them. The men have faith in this board as well as the company.

What we as committeemen mean by being fair is the case that happened to me before I was a committeeman. At the colliery in which I am employed, we were to work in a vein for a set price, not knowing that what had been set was below the standard for that particular work. About a month later we discovered it and took the grievance to the committeemen, who couldn't settle it. It was then taken to the Conciliation Board, who couldn't settle it either. It was given to the umpire, who settled it in favor of the union men, thus giving us our back pay.

Mr. B:
"This decision does not necessarily mean that the union alone was fair."

All that we committeemen want is fairness.

Clarify contract . . . Deal fair and square

"We need union cooperation" . . . *Association Secretary*

Mr. A:
"Everything this man says has a basis of truth in it."

Mr. A:
"The miners' district president does not properly handle his field representatives. The union should handle its affairs responsibly."

Things are tough in this district.

The president of our district is appointed in Washington. He doesn't have to answer to anybody but Mr. Lewis, and he gets backing for anything he wants.

That's why he won't turn loose any authority to any of his district men or the locals. We're only wasting time when we try to deal with one of his lieutenants. That also explains why we have so many cases coming up to conciliation in this district.

We use a panel of umpires to decide cases the conciliation board can't reach a decision on. The union and operator representatives pick an umpire from this panel for each case. This is different from the way we used to do it. We used to have a permanent umpire, and then we changed over to having two or three umpires, any one of whom we might call in when we had three or four cases to decide at one time. But we found under the old systems that the umpires leaned toward evening things out between operators and the union. That is, they weren't deciding cases on their merits but were trying, consciously or unconsciously, to keep things even-Stephen between us and the union.

But our new umpire system isn't working very well now. In fact, the district union president says he won't go along with it any longer, though he agreed to it in writing not long ago. He thinks the umpires aren't throwing enough decisions his way. That's one big trouble with our situation—we can't depend on the district president.

To show you I'm not prejudiced, let me tell you what happened with a labor commissioner we brought in a couple of years ago. He's a good strong man. He came well recommended and he's done all right for us. When he first came in, I talked over his job with him but I didn't tell him about any of the troubles I knew he'd have. I thought he ought to learn for himself. He worked into his job with a lot of energy and enthusiasm, but he began to cool off after a while. Finally he came into my office and told me he felt he wasn't getting anywhere. "I can't depend on the district president," he said. "He makes a promise and that's the last I ever hear of it."

But getting back to conciliation cases, there's a big backlog of cases the board didn't decide that have never gone to an umpire. If the union men see a case is going against them in the conciliation board, and if they think they can't win with an umpire, they'll end the conciliation conference and leave, saying, "We'll let you know later." We've got nearly 250 cases on our books now that never have been decided one way or another. If we tried to force them up to the umpire, we'd get into more wrangles with the union. Yet if we don't force them to a decision, the union accuses us of stalling.

Mr. A:
"There is no grievance that cannot be handled under the contract."

Sure, we have a lot of trouble over what the contract means. In fact, I think the union wants to keep the contract vague and ambiguous. That way, it gives the union plenty of opportunities to argue with us and show the men how hard the union works.

Take the matter of grievances. The operators think they're entitled to file grievances against the union. But the union says the contract doesn't give management the right to file grievances.

Mr. A:
"The miners have been making steady inroads in the contract provisions, not by arbitration but by company-wide or local strikes, made possible by removal of the penalty for 'wildcat' strikes."

Take another case: The national agreement of 1950 canceled no-strike and penalty clauses in the Appalachian Wage Agreement of 1941 and the national agreement. The union says that action canceled the similar paragraphs in our district contract. We say it didn't. We're still arguing about it.

Mr. A:
"The miners obtain much of their control by pushing their safety program. Their sincerity may be open to question. Could it be that the object in securing control of the U. S. Bureau of Mines is primarily for the purpose of eliminating non-union mines? Non-union mines present a real threat."

We've got a strike going on in the district now about machinemen. In our rate scale a certain rate is printed for "machinemen." The union says this means two men on every machine. The company says it doesn't mean anything at all about the number of men on a machine. It only says what machinemen must be paid. The company involved wants to pay for only one man. A little while back a boss ordered a machine helper to work somewhere else and while the helper was away the operator was injured. So the union says that only one man on a machine creates "imminent danger" and, under the safety clause, the safety committee shuts the mine down.

So you see why I say we have it tough in our district. Our only hope is to get a new district president who'll be reasonable and work along with us on a fair and square basis.

Nine Ways to Keep Peace at the Mine and . . .

Union men say: ▼ **Management men say:** ▼

STICK TO THE CONTRACT

"You've got to want to make the contract work."

"The structure you build good labor relations on is the contract."

SEEK OUT THE FACTS

"For a union official, nothing takes the place of going inside the mine to see for himself."

"Just find out the facts and sit down and talk them over."

"Any top operating man who wants good labor relations must spend a lot of time at the mines."

"When we have a discharge case, we make sure we have all the facts before we move."

STRENGTHEN YOUR FOREMEN

"Foremen are the key to good labor relations at the mine."

BE HONEST AND BROADMINDED

"Honesty is the only way you can really lead men—that and knowing your job."

"The management has always had the courage to admit when they are wrong. We have tried to do the same."

"Sometimes when you put yourself in another man's place, you see things differently."

"Whenever I believe the company is wrong, I admit it and try to correct the wrong."

RESPECT THE MEN ON THE OTHER SIDE

"We like to deal with a strong operators' commissioner—one who's strong and fair."

"The men have faith in the Anthracite Conciliation Board as well as the company."

"It takes men who know and trust each other to make good labor relations."

"If an operator deserves loyalty from his men, he'll get it."

KEEP YOUR SHIRT ON

"It's surprising how anger vanishes when the causes are brought in the open."

"A union official has got to deal courteously with everybody."

"I always stop and think for a couple of minutes before I start to chew a man out . . . Then I can talk calmly and rationally to him."

CONSIDER THE PERSONAL FACTOR

"Every man wants recognition for his individual importance and his accomplishments."

"I always look for ways to contact our committeemen. The better I know them and the better they know me, the better we'll get along."

SHARE YOUR PLANS AND YOUR TROUBLES

"We always try to keep the mine committee posted on what's going on and what we plan . . . also individual men we're having trouble with."

"Our management people and local union officials meet together every month . . . We talk about how to get good working time and improve life in the community."

BE A GOOD NEIGHBOR

"We think the answer lies with wives and children as much as with the men."

. . . Five Roadblocks to Surmount

Union men say: ▼ **Management men say:** ▼

THE CONTRACT IS FAULTY

"The contract never has been revised since handloading days."

"The whole atmosphere [of the cleaning plant] is unfamiliar and the contract is of little help."

"I think the union wants to keep the contract vague and ambiguous."

"Sure, we have a lot of trouble over what the contract means."

CONCILIATION DOESN'T WORK

"If the operators rough us up, it's natural for us to want to rough them up too."

"Some umpires go beyond the contract."

"The union district men never admit they're wrong about anything. We can't get a clear-cut decision from them."

"If the union men see a case is going against them in the conciliation board, they'll leave the conference saying, 'We'll let you know.' That's the last we hear."

TOP MEN ARE BULL-HEADED

"The operators tell us, 'O.K., boys, we admit you've got a case . . . and you'll win if it goes to the umpire . . . But you'll have to take the case all the way up.'"

"The district president is appointed in Washington. He doesn't have to answer to anybody but Mr. Lewis, and he gets backing for anything he wants."

THERE'S NO LOCAL AUTHORITY

"Some superintendents have trouble because they don't have any real authority of their own. They take their orders from absentee landlords in New York."

"The district president is the only one who's allowed to make a decision. He won't turn loose any authority to any of his district men or the locals."

SUPERVISION IS WEAK

"We find the foremen are inexperienced."

"Lots of men make good superintendents as far as production goes but they don't know anything about getting along with men."

"A good many mine foremen and superintendents get 'in the middle' of a faction fight between different groups in a local union. It is never good to become identified with any particular faction. Miners resent management meddling in union affairs."

Treat men as men . . . Build on contract

"The human element is important" . . . *Assistant Superintendent*

Mr. B:

"A good idea. But this should read 'from the top down' instead of 'all the way to the top.'" ▶

Mr. B:

"This likely refers to a small organization. [*Ed. note:* It doesn't. This is a big outfit.] However, it's good practice." ▶

If you want good, friendly relations with your men at the mine, you've got to have everybody wanting good labor relations all the way to the top. That's what we've got in this company.

The structure you build good labor relations on is the contract. It's all spelled out there. All I ask of my men is that they be as fair and honest as I try to be.

Of course, the human element is important. I take every way I can to make men feel like somebody—give them recognition. Whenever any of my men get sick or laid up, I visit them. I usually take along a pack of cigarettes or some chewing gum or candy—not much, but enough to let the man know I'm thinking about him and want him to have a little pleasure. That helps with the individual. It helps also with all the men, because the word gets around.

I get mad sometimes and call in a man to chew him out. It happens with foremen about as often as with miners. But I always stop and think for a couple of minutes before I start in. I think how I'd feel if my superior talked to me the way I started to talk to my man. That brings me back to earth. Then I can talk calmly and rationally to him. It saves wear and tear on me, and I don't say things the man could throw back at me.

Know your job . . . Be honest

"Few grievances—quick settlements" . . . *Vice President (Oper.)*

The Anthracite Board of Conciliation probably has more to do with smooth labor relations than anything else. The Board was organized in 1903 and will celebrate its fiftieth anniversary next year. It's probably the oldest set-up of its kind in existence today, and it's one of the big reasons why we have few grievances and quick settlements today. The men have learned to respect it over these 50 yr. They know that nonsense complaints will be turned down and just claims will be honored.

The Board is made up of six members—three from the union and three from the operators. It doesn't negotiate agreements. Its job is to take up and decide disputes arising out of the agreement and to interpret and apply the agreement. Any dispute that can't be settled directly by the parties concerned goes to the Board for decision. Decisions of the Board are final and binding. If the Board can't reach agreement by a majority vote, an umpire is called in. His decisions, like the Board's, are final and binding.

Our system has worked well for a long time. Nobody knows exactly how many grievances have been raised at individual collieries but we estimate that 9 out of 10 are settled without going all the way to the Board. Over 6,600 cases have been sent up to the Board and given numbers. About 3,000 of these were disposed of by mutual agreement before the Board made a decision. The Board itself decided about 300 cases. The remaining 3,300 were decided by the umpire.

The grievance committee may take up with management any complaint for which a man has not been given satisfaction by his foreman. The committee, with company officials, may examine any working place in the mine where a grievance exists or where conditions are said to be unsafe.

The grievance committee also has the right to negotiate rates for new work. That's why we always keep the committee informed about any new work we plan. By new work, we mean a new vein or work of a new kind.

Our agreement in anthracite guarantees our men certain rates for certain classes of work and assures them that they may continue at their jobs as long as their jobs exist if they are capable of doing the work and don't give cause for being discharged. The company is assured of a stable wage scale, fair and workmanlike performance on the job and good behavior.

That's the way our anthracite agreement works.

But the agreement itself is not enough. It takes men to make good labor relations—men who know and trust each other.

I was born and reared here in the anthracite region. The men in my family had been in mining long before I was born. Three of my uncles were killed in the mines. I started out as a boy picking slate. With one job and another, I moved around a lot in the region. I lived with miners and worked with them. When we were boys, the man who's now the union's district president lived in the house next to me. So I know the miners, operators and union men in this field —know them personally.

Not long ago, for instance, I went inside to look at a chute that was giving trouble. On my way in, over half of the men recognized me and called my be my first name and told me about the trouble up ahead.

Let me give you an example of how knowing your men helps out. We had a man we all called "Rocky." Rocky was a big strapping man—a fair miner but not easy to get along with. He liked to order men around in the mine and he wouldn't pay attention to the foreman. One day he took some men off one job and put them on another. We had to fire him. The case went up to the Conciliation Board, and the Board upheld the company.

But Rocky was mad about it and appealed to UMWA headquarters in Washington. Down in Washington they set up a special commission to look into Rocky's case. The commission met here in this room, and I was sitting in this chair. Things got pretty hot. One of the union officials got up and started calling me every name in the book. I could see that Rocky was getting uneasy. Before the union man could go very far, Rocky got to his feet and told him to shut up. Pointing to me, Rocky said: "I've known this man a long time. He's always given me a

Mr. A:
"The fundamental weakness of the operators' position lies in the fact that they are made up of a relatively large number of small units while the miners' positions are controlled by one strong central organization."

square deal. I won't let anybody talk to him that way. Drop the case."

We couldn't take Rocky back on, but he's making a good living now not far from one of our collieries. I saw him just the other day. His case proved to me once more that if an operator deserves loyalty from his men, he'll get it.

Mr. A:
"There is no advantage in evading or ignoring grievances, whether real or imaginary. The committees of the miners have to be dealt with with respect."

Any top operating man who wants good labor relations at his mines must spend a lot of time at the mines. I often go out myself, with some other company officials, and spend a couple of days at a mine clearing up complaints. I sometimes find the company is wrong. In fact, I always try to look for ways in which the company could be wrong and try to see each case as the miner sees it. I don't believe, for instance, that men ought to push cars 200 to 300 ft. But if they do have to do it, even for a little while, they ought to be paid for it. Whenever I believe the company is wrong, I admit it and try to correct the wrong. That way, we settle a lot of complaints right at the mine with a minimum of trouble.

Most of our cases in anthracite are over established practices, changed conditions and new methods, all involving rates of pay. Most of the time we can rely on the precedents and rulings of the Conciliation Board, which go back nearly 50 yr now. These practices are important to all of us. Putting a practice to work in the wrong place—carrying it over from first mining, where it's fair, to robbing, where it isn't the right practice—could do a lot of harm, financially and otherwise. That's why we're as cautious about the application of practices as we are about applying rates. Though we don't always see eye to eye with the union in interpreting this principle, we all agree that the principle is fair and right.

I ought to add one more thing that may make our labor relations here in the anthracite region a little smoother than in bituminous. We live and work in a small area. Even if we move from one company to another, we don't move very far away and we probably see many of the same men year in and year out. That way, we get to know each other well—miners, management men and union officials. In that kind of relationship, honesty and fair dealing are the key to friendship and mutual respect.

Build on principles . . . Keep men informed
"A square deal for everyone" . . . *General Manager*

We get along with our men all right most of the time, in spite of a few barriers. Those barriers are:

1. Suspicion of our motives and methods.
2. Fear of what the district union officials will do or think.
3. Lack of local authority for the local union.

Mr. B:
"Not entirely true. The young men also are suspicious."

Suspicion is stronger in the older men. The old men went through some hard times in coal and had to deal with companies that didn't always play fair with them. You can't blame them. We find it's a little easier to approach the younger men and reason with them.

Mr. B:
"A poor setup if local officials have no power to decide grievances."

Down here the district union headquarters plays a strong hand. The district president is appointed by Mr. Lewis. All decisions are made in the district office. The locals have no power at all. If we have any trouble, a district official is in here right away to take over.

The district officials never admit they're wrong about anything. We've taken a lot of cases up with them in which the miner was clearly wrong. But we can't get a clear-cut decision from the district men. "We'll let you know later," they say, and that's the last we ever hear from them about some cases. That's not fair to us, and it's even less fair to the man involved in the case, since he's entitled to a decision right away.

Mr. B:
"A bad state of affairs, where district officials will not cooperate in making clear-cut decision."

Even at that, we get along on pretty good terms with the local. About our only trouble is with discharge cases. A year or so ago we had a committeeman who tried to take on too much authority inside the mine. He began to assign men to work and even took the controller off a locomotive that he had taken over for his own use. He hid the controller in a special place so he'd always have a way to get around the mine. We had to fire him. He wanted to make a grievance out of his case but the local committee told him he didn't have any case at all. Finally, it took the district officials to quiet him down. That was one time the district worked along with us.

Mr. B:
"Certainly, this decision was correct."

But the local gets out of hand sometimes. A couple of years ago we had a hoist man who turned down an offer for weekend work. Since he said he didn't want it, the foreman got somebody else to run the hoist. Later the man claimed he ought to be paid for the weekend when he didn't work. He argued that the work hadn't been offered to him, though he was entitled to it. We turned him down. But he went out and stirred up his buddies, and when we got ready to meet with the mine committee, there was a crowd of over 100 men trying to push into the meeting room. I went out to talk to the men and reason with them. I told them they wouldn't gain anything by mob pressure and that we wouldn't even consider the case until the crowd broke up and went home. They left then, and we went on with the case. Later, several of the men told me they didn't know why they had come. Somebody had told them to be there at a certain time but gave no reason.

I think there are three reasons why we get along with our men:

1. We're a fairly old company and we've been in the business of managing plants, mines and men for a long time. Nearly 25 yr ago our president and founder established a policy for conducting his business. That policy was based on high standards of conduct, an efficient and loyal organization from the top down, investment in the best equipment and facilities, cooperation between the business and the community, and fair treatment of customers.

Besides all that, our founder's policy set up standards for dealing with the people who work for the company. These standards include a square deal for everyone, the best compensation possible, incentives for advancement, opportunities for promotion, good and safe working conditions, good living conditions, mutual interest and a cooperative spirit. Those principles have been our guides.

2. Our management people and local union officials meet together every month. We don't discuss grievances at these meetings. What we talk about is how to get good working time and how to improve life in the community – better streets, taking care of the trees, setting up playgrounds, organizing sports, painting houses, and so on. At these meetings we also tell the union men about our plans to expand or curtail our operations and about new work methods we want to install. Whenever we have a new piece of equipment, we put it on display where everybody can see it. We set up posters telling what the machine will do and what it cost the company.

By the way, I think we handle safety questions pretty well, too. We have a safety man for each crew. Every crew elects its own man. He's supposed to keep his eye open for anything that might cause an accident—slate, open motors, bad cable splices, dangerous work habits. We think these safety men have helped us avoid a number of injuries.

3. We give our foremen real standing, make them part of the management team and give them the goods to work with. We think they're the key to good labor relations at the mine. We've set up a training course, or a series of courses, covering everything from safety and first aid to the economics of capitalism. We had to write some of the courses ourselves, we got some of them from the National Foremen's Association (we have a local chapter of that organization here) and other groups, and we use the Bureau of Mines courses and extension classes from the state university. A good many of these courses are open to miners as well, if they want them.

We also have some open-forum meetings for our foremen, where we discuss questions that bother them. These meetings give them a chance to air their troubles and get our help. We often wind up with ideas about organization and responsibility that are clear where they were vague before. Last time we met, for instance, a section foreman raised this question: "Trolleymen and motormen are responsible to the mine foreman, aren't they? Does that mean they're responsible to him when they're in my section?"

"That's a question we've never had raised before and it's a line of authority we've never made clear," the superintendent acknowledged.

We ended up with a clarification something like this: Trolleymen and motormen are responsible to the mine foremen for the general performance of their duties—for being at work on time, keeping their equipment in good condition, doing their part to keep the mine running full time. They're responsible to him also when they're working on the main haulageways. But when a trolleyman or motorman is working in a section, he's answerable to the section foreman for specific jobs and safe practices in that section.

Mr. D:
"It's too bad that so many union committees and management members meet 'to fight a case' instead of 'to settle differences.' Grievance meetings are more often controlled by attitudes and emotions than by facts."

Mr. A:
"Operators can improve their position by consistent fair dealing and determination to stand by their principles."

Mr. B:
"This company has the right attitude."

Mr. B:
"An excellent idea, but nothing new. It's similar to what I remember was started almost 30 yr ago with another company and its union officials. It proved very satisfactory."

Mr. B:
"Good idea."

Mr. D:
"Friendly labor relations are in direct proportion to the type of face supervisors you have. More time needs to be given to training foremen."

Cooperate on settlement . . . Follow through

"Too many cases go to the umpire" . . . *District Union Official*

The biggest trouble we have here in our district is choosing an umpire for our disputes. We select a new umpire for every case the joint conciliation board can't settle. Our contract says operator and union representatives must agree on an umpire. Some time back the operators' commissioner refused to take any step to agree on an umpire—in fact, said he never would agree on any umpire for this particular case. We don't think that's according to the contract.

Mr. A:
"This case was very unusual and cannot be taken as a criterion."

There's another trouble with umpires. Some of them go beyond the contract. Let me show you how that happens. Our contract says that a man who's been unjustly discharged must be reinstated with full pay. If he's justly fired, he loses his job and gets no pay. The contract doesn't say anything about half pay. But we took a discharge case to an umpire not long ago. He awarded half pay to two men who had been fired. That's what I call rewriting the contract.

Mr. A:
"I refer you to certain decisions of the U. S. Supreme Court. The Supreme Court decides on the Constitution as the judges see it. An umpire can do no more in relation to the miners' contract."

Down here in this district, too many cases go up to the umpire. That's because some operators take this position: "O.K., boys, we admit you've got a pretty good case and we think you'll win if it goes to the umpire. But we won't give in until the umpire decides it. If you want to get what's coming to you, you'll have to take the case all the way up. And we'll fight you all the way."

When the operators hand out that kind of treatment to us, it's natural for us to want to rough them up too.

Mr. A:
"This man had the name with the union officials of being fair. Therefore he was able to get cases settled —something the operators' officials could not do."

We like to deal with a strong operators' commissioner. Several years ago I dealt with a commissioner who really followed through on decisions of the umpire, even when they went against the operator. I remember once a company neglected to carry out an umpire's decision about working conditions. This commissioner got on the phone and told the operator that if the umpire's decision wasn't carried out, right now, he'd kick the operator out of the association.

We've got a strike going now over what the contract means. The contract says "machinemen" shall be paid a certain rate. It doesn't say machineman. We say that means there must be two men on every machine. There's a safety reason also for having two men on a machine. At this mine where the strike is, the company wants only one man on a machine. A few days ago a foreman pulled a helper off a machine to do something else and left the operator alone at the place. A little while later the operator got his chest crushed by a piece of slate. That's why we say there's imminent danger if there's only one man on a machine. And that's why the men walked out—safety and the fact that the contract says machinemen.

Mr. A:
"This statement is absurd. The miners were wrong in not arbitrating. Some situations call for machine men to have helpers and some do not."

Mr. A:
"The error here is in the contract itself."

Take another part of the contract. It says the first step in settling a grievance is "between the aggrieved party and the mine management." The operators claim they can be the aggrieved party. We say they can't. They've already got the world with a fence around it anyhow. They've got the Taft-Hartley Act and the right to manage their properties. And now they want to throw grievances at us. Their interpretation is ridiculous.

Mr. A:
"The charge is partly a true bill."

Lots of men make good superintendents as far as production goes but they don't know anything about getting along with men. Other superintendents have trouble because they don't have any real authority of their own. They take their orders from absentee landlords in New York. That hamstrings the superintendent.

Mr. A:
"It is far better to have all authority necessary on the job to settle any dispute. Associations are largely for settling disputes but even they are handicapped if they cannot secure prompt coordination from the operating company."

You can lose a discharge case and still do the man you fought for a good turn—and maybe the operator too. A little while back we lost a case like that. The man was fired for refusing to take orders. I went in to see the superintendent and admitted the man was justly fired. I asked if the man was a good worker. "He was—one of the best," the superintendent said. I reminded him that he'd have to get somebody else to do the work and told him he might not get anybody else as good. The superintendent agreed. Then I pointed out that the man probably had learned his lesson—he'd been out of work for a week already—and asked the superintendent to hire him back. That did it. It was a favor to the man and the superintendent. You can work things out that way most of the time if you have reason on both sides.

Mr. A:
"Sometimes this can be done."

Mr. A:
"Correct, but frequently union officials do not act on this principle."

But you've got to be careful about one thing—never take a complaint up unless you're sure you've got a case.

Use reason . . . Keep men posted

"Try to Understand" . . . *Colliery Superintendent*

You don't get good labor relations at the mine by bossing men around and telling them off. If you try that, they'll want to show that they can be bosses, too. You can be firm without being bossy.

You get good labor relations by reasoning with men, taking them into your confidence and treating men as individuals. Try to understand their point of view. If you do that, you'll often find they're right.

You also try to look behind complaints and grievances to find the real reason for dissatisfaction. Lots of times it isn't real dissatisfaction with the company. Sometimes complaints begin to pile up. That doesn't always mean something's wrong with management. Maybe the men get an idea that a mine committee that's quiet isn't doing a good job, so they build a fire under the committee. Suddenly you've got a lot of complaints on your desk.

You can look for a little extra trouble also when it's time to elect a mine committee. The committeemen think they've got to make a good show to get re-elected.

We always try to keep the mine committee posted on what's going on and what we plan to do. That includes work methods we plan to change, new machinery and new sections we intend to mine. We also keep them informed about individual men we're having trouble with—early quits, loafing on the job, safety violations. That way, the union understands our problems and is better prepared to go along with us if we have to fire a man. Most of the time, though, the mine committee gets hold of the man who's making trouble and straightens him out.

We have most of our trouble with consideration rates, when miners claim that conditions keep them from making their tonnage. But the union's district conciliator has helped us a lot with that problem. He insists that miners put in their time.

The worst kind of case is a discharge. That can cause real trouble unless you've got the goods on a man. And even if you've got the facts, you may have trouble. If you want the Conciliation Board to sustain you, you've got to have the record in detail—dates and hours, violations, warnings and so on.

Mr. D:
"This man's remarks breathe of sincerity."

Mr. A:
"One thing operators fail to realize is that the miners' leaders have trouble controlling their own situations. These men, if weak or stubborn, will refuse to arbitrate cases just to be considered loyal to the men."

Mr. D:
"Good."

We don't have any disputes over safety. The union goes along with us pretty well. Our foremen have freedom to discipline miners for breaking safety rules. But our safety director can't discipline.

If a supervisor wants to get along with his men, he has to take each man on his own merits and treat him as an individual. The very thing that works on one man may be the wrong thing for the next.

For most men, understanding and reason work best.

For instance, one day I found a man asleep in the compressor room. With pressures up to 1,000 or 1,200 lb, somebody has to be watching those compressors all the time. I could have fired him on the spot and the mine committee would have sustained me. But I knew the man's wife had died not long before and left him with three children to take care of. I put it up to him this way: "How would you like for your children to know you'd been fired for sleeping on the job because you were out all night?" That brought him around all right.

Take another case. We had an engine room at one colliery where housekeeping was poor. I walked in one day and saw all the mess.

"How many hours a day do you put in here?" I asked the man.

"Eight."

"How many hours do you sleep a night?"

"About eight."

"How much time do you spend downtown at the drug store?"

"Two or three."

"That leaves you about 5 hr out of 24, when you're awake at home and reading the paper or talking with your wife."

"That's about right."

"But you want things clean at home, where you spend only 5 hr awake, and you're satisfied to work in a dirty place like this for 8 hr. Is that right?"

The man didn't answer, just grinned. Next time I came around the engine room was cleaned up. It's stayed that way ever since.

Some time ago I had a firebrand committeeman to deal with. One day, when I fired a boiler-plant man for not showing up after a 4th-of-July drunk, the committeeman stormed into my office. He really was mad, and he started tell-

Mr. D:
"Most foremen look at people instead of the job. That way, criticism is directed at the man, not his efforts. The talk gets personal, and then you're really in trouble."

ing me off. When he had talked himself out, I called in the man I'd fired and asked the committeeman to stick around while I talked to the discharged man. Here's what I told the boiler-plant man in the presence of the committeeman:

"I'm not talking to you because I want to but because your committeeman asked me to. He wants me to take you back on. But you've been drinking and neglecting your job. It's an important job 24 hr a day, and we've got to have a dependable man for it. You haven't been dependable for a long time. But if your foreman is willing to take you on again, I'll go along with him. Remember, I'm not doing this for you. I'm doing it for your committeeman."

That made everybody happy.

Mr. B:

"Maybe we have wandered off the beam the last few years in expecting our supervisors to be trained psychologists."

The foreman took him on again and in doing so, got a man who had resolved to do a better job. The man got his job back and handled it well from then on. And the committeeman got the stature he really wanted. I had made him look like a big shot to the miner. That committeeman and I got along on friendly terms from then on.

That committeeman, by the way, was like a lot of men around the mine or anywhere else. Every man wants recognition for his individual importance and his accomplishments. If you take that human need into consideration when you deal with men, half of your troubles will be easy to solve. It helps solve many problems right at the mine.

Mr. A:

"Operators can better their situation by training themselves and their officials in dealing with the human equation."

Be honest . . . Get the facts

"You've got to go inside" . . . *District Union Official*

Mr. D:

"Good labor relations hinge on the honest purpose of both sides. But it seems to me that management must take the lead in demonstrating that it is trying to be honest and fair."

What makes good labor relations at the mine?

From my standpoint, a labor man like me has to have a record of honesty and integrity, an open mind and a thorough knowledge of the contract. Also, he must want to make the contract work. He's got to be sure of the facts—deal courteously.

I want the anthracite companies to stay in business and make money so union men will have good jobs. That's why I've sometimes volunteered to help weak companies straighten out their finances and acted as receiver for a few companies that went under. Our union can't be strong unless the companies the men work for are also strong.

The union wants steady work for the men and it wants men to stick to their jobs and give a fair day's work for a fair day's pay. We had a good deal of trouble with early quits for a while after the war. Veterans would come outside after three hours or so, claiming consideration rates, and then go to classes at some GI school. That wasn't fair to the non-veterans working in the mine or to the company. The union moved in on that situation. It's a lot better than it used to be.

We try to keep a close check on labor turnover. If it turns over 10% a year at any mine in our district, we try to find out what's wrong. That happened not long ago at a certain mine. I went out to the mine to investigate. I talked to miners and foremen and the superintendent. The key to the trouble turned out to be the mine foreman. He knew all there was to know about mining coal, but he never got to first base in handling men. He was dictatorial and hot-tempered and discourteous. The superintendent and I talked over the situation and he agreed to work on the mine foreman. The turnover picture at that mine has changed for the better.

Mr. A:

"Each fellow has a different viewpoint depending upon his own particular job or interests."

We try to settle as many complaints as possible right at the mine. That's why I spend a good deal of time underground. For a union official handling complaints and grievances, nothing takes the place of going inside the mine to see for himself. A little while back I had to handle a grievance over water in a working place. So I went inside. I found that neither the mine committee nor management had told me all the facts. On the strength of what I found, we worked out a settlement that was all right for both sides.

That's the kind of thing most of our complaints and grievances are about—working conditions, changed methods and rates. You've got to get inside to see for yourself.

Soreheads and chronic complainers among the men don't give us much trouble. We learn who they are pretty quickly and we learn to pay no attention to them. With the right kind of handling, you can bring them around after a while.

Apply reason . . . Work for understanding

"The solution is producing unity" . . . *Mine Committeeman*

The solving of any labor problem is a difficult question. Following the same procedure each time does not produce the same results. Different personalities are involved in each case. The solution is the producing of unity between individuals.

Mechanical mining has increased the number of jobs around the mines—not the number of men, but the number of operations. Each job presents a different problem.

The problems inside the mine and those in the tipple are different. The modern cleaning plant has almost the proportions of a city. The maze of operations is great. Here we have found our greatest difficulty in settling disputes. The whole atmosphere is unfamiliar and the contract is of little help, as each reads a different meaning into its phrases.

The past year we elected a tipple worker as a committeeman. However, it is still necessary to call the district officials and the operators' association officials to settle most of the outside grievances.

The underground is a different story. Here we are on familiar ground and have a well defined set of rules. Mechanical mining follows the old methods closely enough to permit almost identical solutions.

We follow a standard pattern in handling grievances. Discussions are frank. Only once in the paast 2 yr have we been unable to reach a satisfactory settlement. The settlement in this case was blocked by higher authorities and in no way detracts from our almost perfect record.

This is a simple way of avoiding labor trouble. Just find out the facts and sit down and talk them over.

But there is much more involved. The final decision must be reached by applying reason from every angle. Conclusions cannot be made hastily. When anger is involved, a cooling-off period is advisable and the involved parties should be brought together. It is surprising how anger vanishes when the causes are brought into the open. The solution should remove the causes, if at all possible.

The final decision must be fair to management and to the involved party. This is usually possible when the question is approached with an open mind. Management at our mine has always had the courage to admit when they are wrong. We have tried to do the same, although it is difficult to convince 400 men that a mistake has been made.

We feel a large measure of our success has been due to a complete understanding with management. We seem to speak the same language and approach many things in the same manner. The ability to understand the situation with due regard to both sides has kept our mine working. It has removed all signs of rancor and has made possible a smoother production machine.

Mr. C:
"A big factor in labor relations is the change from tonnage to day rates. Both management and labor think in terms of hand-loading. On this, we have superimposed different thinking based on machine mining and the daily or hourly wage rate."

Mr. A:
"Clear understanding must be had on all grievances."

Mr. D:
"Given a desire to play fair, to acknowledge mistakes and rectify them, to keep in mind that success depends on working together, both sides can contribute much toward a smooth-working and almost trouble-free organization."

Don't interfere in union affairs

"Stay out of the middle" . . . *Vice President (Oper.)*

In my experience, I've seen many good foremen and superintendents get "in the middle" of a faction fight between different groups in a local union who are striving to control the local. As you well know, one way the "outs" in a local union can get control is by being militant and fomenting trouble. This is an old game, and this ambition to rise higher in the ranks of the union is a constant source of trouble.

In these situations, there's no set policy that will guide a man through them. Each case is as different as the personalities you're dealing with. It's always a good thing to remember that those in control of the local some day will be out, and the faction that is out will walk into your office some day representing the local you have to do business with.

I wish I had the answer to this but as I have said before, each situation presents its own problems. While it's impossible to be completely neutral, it's never good to become identified with any particular faction. There's nothing miners resent more than management meddling in union affairs, and very few men have been able to do this successfully.

Do right . . . Settle at the mine

"It takes experience and judgment" . . . *General Manager*

How to keep things running smoothly at the mine?

I used to think I knew. Hadn't had a strike here at the mine since I first came here over 20 yr ago. Then, whammo—I had two, one right after the other.

The worst one was over portal pay. We opened a new slope around on the other side of the mountain. We didn't expect any trouble. We thought the men would drive around. But instead some of them took off across the top of the mountain on an old road. It was a lot shorter, and the jeep they used made the trip all right.

But a state inspector came along last summer and told the men the mountaintop road was unsafe—or he thought it would be unsafe in the winter. That wasn't in his department, but he said so anyhow. And the men began to grumble a little.

This old mountaintop road ran past a tunnel into the mine. We weren't using the tunnel but if we had to we could take men in that way. The trouble was, if we took them in through the tunnel instead of the new slope, we'd add about 45 min to travel time.

One day last summer in a rainstorm, the jeep broke down near the tunnel. To help them out, we took the men in through the tunnel that day. But we made the mistake of paying them portal-to-portal. The men thought they had hold of a good thing. They demanded that we take them in through the tunnel every day and give them portal pay. We refused, and they carried the grievance up to conciliation. Finally they struck. After a lot of trouble we worked out a compromise. Now they all use the new slope to go inside and we pay them extra for traveling to the slope, whether they go around the long way or cut across the mountain. We've improved the mountaintop road also.

Mr. A:

"The contract is specific that foremen shall not do work for which a wage scale is set out. But at many mines a foreman may demonstrate, provided he does not displace anyone. There is no use in the operator's quarreling with the terms of the contract."

We have some complaints because the foremen work too much. A foreman used to boss 100 men or more 20 yr ago but now he has only 10 or 12 to look out for. That's because we've mechanized. It takes about $200,000 to equip a working section these days, and you just can't take the risk of turning men loose on those machines without close supervision. So you've got more foremen than you used to have. But that means the foreman doesn't have much to do. He gets bored with doing nothing and starts to work a machine or do some timbering. That causes trouble with the men. They think he's taking work away from them. Also, they don't like the foreman looking down their neck so much.

Mr. A:

"Many foremen do not have the ability to deal with men on a human and humane basis with efficiency and with the retention of the goodwill of the men."

Being a good foreman takes experience and judgment, and sometimes the only way a foreman can learn is by making mistakes. Since I know all our men personally—call most of them by their first names—I do all the hiring and firing here. But I had a foreman a while back who fired a man on his own. I knew the man had been giving trouble because the foreman had told me so. But after he was fired, the man asked the foreman for a letter of recommendation so he could get a job somewhere else. The foreman wrote a fine letter for him, telling what a good man he was. The man came in my office and showed me his discharge slip, and then he showed me the letter. That really put me in a box, but I saw a chance to make a better foreman. I sent the man back to the foreman with a note saying, "If this man is as good as your letter says he is, we ought to keep him on the payroll." If the man had wanted to make a grievance out of his discharge, that letter would have made me look bad before the conciliation board. Now, when a foreman at this mine wants to discharge a man, he simply fills out a slip that says, "I don't need this man any more." The man brings the slip to me, and I tell him why he's being fired.

I always try to do the right thing for the people in our camp. I've lived here most of my business life, and I know the men and their wives and children. I know when they get sick and when they get in trouble. I send a truck around with free coal when a man is sick for a long time, and I see that he and his family get something to eat. Whenever a baby is born in town, I send a small Bible.

Mr. A:

"The district officials come in only when local agreement cannot be made. I have had no more difficulty on that level than on any other."

We try to settle all our complaints here at the mine. Most of the time we don't have any trouble. But that's not always easy, especially when the mine committee brings in the union district officials. We have real trouble up on that level.

Head off disputes . . . Settle by contract

"Minimum of friction" . . . *Master Mechanic*

Labor problems can usually be divided into two classifications. In the first class are those that involve the settlement of a dispute between the worker, or workers, and management. This includes all arguments over interpretation of the contract and all grievances, real or fancied. The second class consists of problems arising in the daily conduct of the supervisor with his men.

Our method of handling the first class of problems is as follows:

First, try to avoid them. To do this in matters clearly defined by the contract, it is only necessary to abide by the contract. In matters that are not clearly defined, we try to anticipate what the ruling would be if the case went to arbitration, and act accordingly. For instance, in my department, if I see the possibility of such a case coming up, I discuss it with my superintendent. He in turn takes the matter up with the public relations department, who then, if not sure of the answer, discusses the matter with representatives of the operators' association. These men, through years of experience in settling controversies, can generally give us an answer that will avoid a dispute.

When disputes do arise at our property, they are settled in accordance with the contract. The worker, if not satisfied, turns his case over to the mine committee. The mine committee takes the case up in the proper manner until a decision is reached by a meeting of district officials and representatives of management, or by an arbitration board.

We are fortunate at our property in having fair-minded, clear-thinking mine committeemen and local union officials. As a result, we have been able to operate our mine over a period of years with a minimum of friction. At the same time, we have been able to settle our disputes to the satisfaction of both sides.

Mr. C:
"Very definite improvement during recent years has been apparent. Further improvement will be made as rapidly as management and labor can modernize the thinking of their people."

We now come to the second class of problems, arising from the daily contact of the supervisor and his men. These problems are many and varied. Some examples are as follows:

Grievances—It is necessary to work a time-and-one-half shift. The foreman asks Doe to work. Smith wants to know why he wasn't asked. Some dirty or onerous task arises. Doe is assigned. He wants to know why he gets all the dirty work.

Training—A new worker starts on the job, or an old worker is given a new job. The difference between a good job of training and a poor one may mean thousands of dollars to the company over a period of years.

Efficiency—We all know the worker who does nothing for which you can discharge him. In fact, he almost does nothing—period. Then there is the man with a chip on his shoulder—a very good man when he wants to be, yet only about half efficient because of his mental attitude.

Solving these problems and others is the daily task of the foreman. How well he accomplishes this is the measure of his value as a supervisor.

How can the supervisor do this daily task?

Below are some rules for the supervisor. If he follows them, he will be well on the road to success.

Be fair—Treat all men alike. Keep a time record for extra shifts and overtime. Divide unpleasant tasks equally.

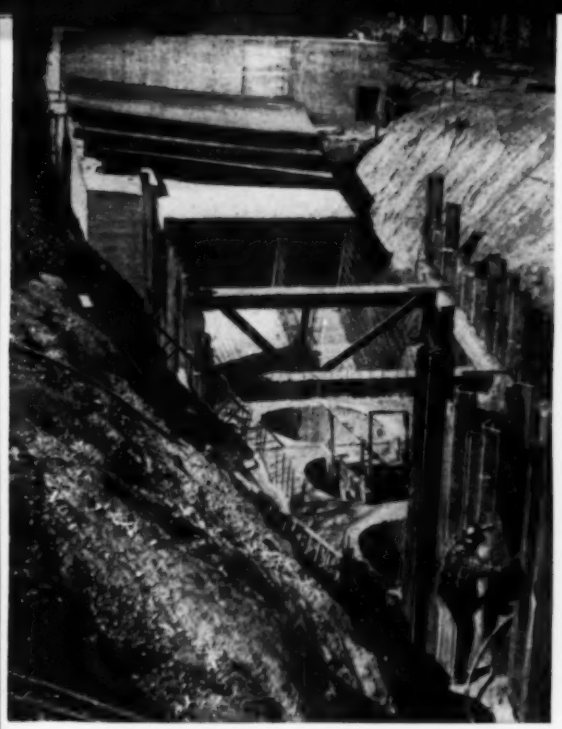
Explain—Tell your men why they are assigned to certain tasks; why you want job "B" done before job "A"; or why you stop work on job "A" to work on job "C." It's not always possible to work men in their proper turn or to divide unpleasant tasks evenly. Explain to the injured party why.

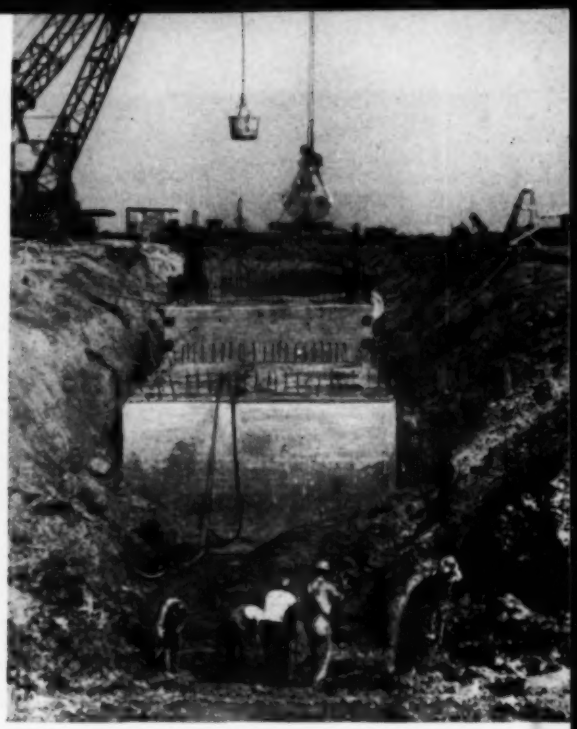
Mr. D:
"If our foremen concentrate on developing the skills and teamwork of their men, we will have reduced our troubles to a minimum."

Know the job yourself—You can neither train a man to do a job nor can you judge if it is being done efficiently unless you understand the job yourself. Foremen often find themselves supervising a job with which they are not familiar. When this happens, it is the foreman's duty to learn the job. He doesn't have to memorize every detail but he should know enough to train a new man or recognize whether it is being done properly.

Mr. D:
"The foreman's big job is to train employees to be good, dependable workmen, thus enhancing the worker's security. His next job is to coordinate safety and production."

Follow the golden rule—Take a personal interest in your men. Be concerned about their health and their problems. Give a pat on the back to the man who does a good job. When necessary to criticize, do it privately and constructively. Pass on to your supervisor the advances your men are making. Don't hold a grudge for past conflicts. Judge the man as he is today, not what he was yesterday.





CAISSON SINKING—first 111 ft of slope was built in open cut and within steel sheets, left illustration, which shows one of the three caissons in the center. Clamshell buckets (right) mucked through 10-ft-diameter holes in the caissons—six in the two smaller and 16 in the larger. All caissons were formed in 15-ft-deep open cut to eliminate unnecessary sinking.

Caissons Solve Sinking Problem

How three concrete caissons were used to get down through 65 ft of soft water-bearing material in sinking the new Peabody No. 10 slope

By W. G. HUYSMAN, Field Superintendent,
Contracting Div., Shaft & Tunnel Dept., Dravo Corp., Pittsburgh

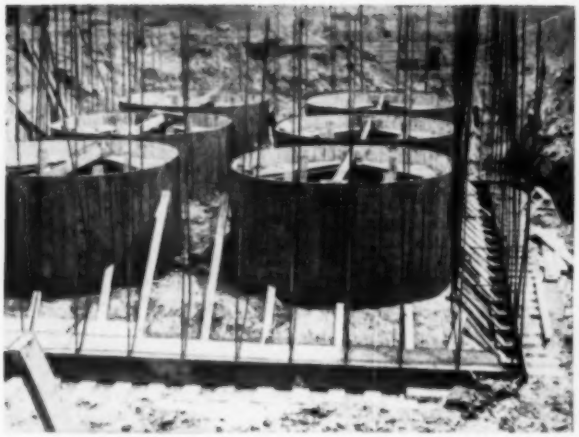
CONCRETE CAISSONS were the answer to the problem of getting down through soft material in sinking the belt slope serving as the main opening for the new No. 10 mine of the Peabody Coal Co., near Pawnee, Ill. To reach the coal seam, at a depth of 350 ft, the slope, on a 16-deg inclination, is 1,280 ft long. The opening, rectangular in shape, is a minimum of 8 ft high and 18 ft wide. In addition to the 48-in belt conveyor in a 6-ft-wide compartment, there is a single-track 11-ft-wide haulageway for movement of materials and personnel.

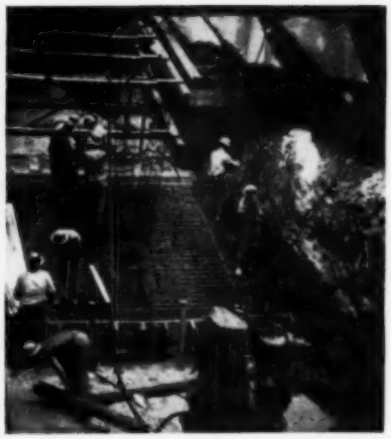
The advantages of eliminating the conventional shaft—with its skips, guides, cables, and consequent high maintenance and operating costs—were considered sufficient to justify the extra initial cost of a slope. The longer time required to drive the slope, rather than sink a shaft, was not expected to extend the date when the mine will be in full production, as a result of installing temporary skips, hoist and tipple at the 15-ft-diameter ventilation shaft, construction of which was rushed to completion to serve as an access shaft for extensive underground development. The new slope was driven upward from the coal seam as well as downward from the surface.

SOFT SURFACE THE PROBLEM

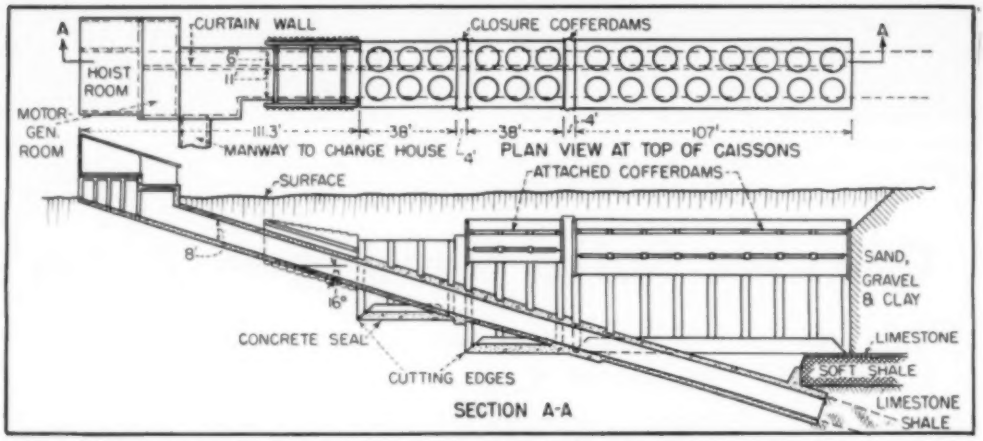
Feasibility of the entire project depended upon successful construction of the slope from the surface through a 65-ft depth of water-bearing sand, gravel and clay. Dravo proposed a practical method of building the slope through this soft ground and far enough into sound rock to permit use of ordinary sinking and raising methods for the remainder of the slope. Peabody awarded Dravo the contract to build this portion of the slope and also to sink the 350-ft ventilation shaft.

The reinforced-concrete-lined ventilation shaft, 15 ft in diameter, was completed in 4 mo using methods which have become standard procedure with Dravo. Depending upon the stability of the rock, sinking advanced below previously poured concrete lining as much as 50 ft before lining was placed in the exposed rock section. Stub entries were driven into the coal seam and were lined with concrete. Steel-liner-plate rings totalling 32 vertical feet were placed





CAISSON CONSTRUCTION—lower 6 ft of outer walls were wedge-shaped to roll earth toward the center of the "work chamber" under the caisson. Left illustration shows steel cutting edges; right photo, steel reinforcing for slope with cutting edges of largest caisson resting on rock approximately 65 ft down.



CAISSON PLAN—soft material 65 ft deep at the surface necessitated caisson use for the top section of the 1,280-ft slope.

CAISSON BREAKTHROUGH between sections at closure cofferdam (left). Right illustration is portal view with hoist foundation on top. Slope size is 8x18 ft minimum.

LOOKING DOWN SLOPE as it neared completion. The 6-ft compartment (left) is for the belt; 11-ft center, track; and right, man-trip loading ramp.

through soft ground at the surface. Immediately upon completion of the shaft, Peabody began preparations for underground development and for driving up from the coal seam.

THREE CAISSONS SUNK

Sinking three reinforced concrete caissons featured construction of the soft-ground section of the new slope. The first caisson, 107 ft long and 28 ft wide, was sunk until its cutting edge had uniform bearing upon rock. After inspecting the underlying rock from a test pit excavated beneath the caisson, a satisfactory location was selected for making the transition from open cut into slope construction. Working from the end wall of the caisson downward to this point in short sections, excavation was made and the concrete floor, walls and roof of the slope were poured. Using steel beams to support the rock overhead, several feet of tunnel were driven and lined with concrete.

With the location of the slope thus established, work on the other two caissons, each 38 ft long and 26 ft wide, was started. These were formed so that the slope passed through them near their bottoms. Consequently, each was sunk to a predetermined elevation. To prevent any future settlement, a concrete seal 3 ft thick was placed under each of these caissons.

The three caissons were separated by 4-ft spaces. After all sinking was completed, steel sheet piles of arch-web section were driven between the corners of adjacent caissons thus closing off the ends of the 4-ft-wide openings. The small cofferdams thereby formed were excavated to a depth of 3 ft below the slope floor, the sheet piles being braces as excavation progressed. Short beams spanning recesses were left in the caissons. Holes slightly larger than the slope were blasted through the end walls of the caissons and the concrete construction of the slope within the first caisson was extended through both smaller caissons and closure cofferdams. From the last caisson to the surface, a short section was built within steel sheets and the remainder in open cut. Incorporated in the portal section is a man-trip loading platform and foundations for the main hoist and motor-generator set.

CAISSON ADVANTAGES

Merits attributable to this method of construction are:

1. Ground at the surface was disturbed little beyond the width of the slope; nearby buildings were founded on simple spread footings and were being built while caisson sinking was still in progress.

2. The exact break-under location did not need to be determined until satisfactory rock was located within the test pit.

3. Strata of wet running sand encountered during the sinking were cut off as the caissons dropped and caused no further trouble.

4. The large caisson, firmly seated upon rock, protects the transition section of the slope from earth pressures which might otherwise be excessive.

The design and method of building the concrete caissons was generally similar for the three. Each was rectangular in plan with the outside surfaces made as smooth and true as practicable. Steel cutting edges were provided at the bottom of, and flush with, the outside surfaces. The lower 6 ft of the outside walls was wedge-shaped, the inside faces sloping upward and inward from the cutting edge. As a result of this shape, earth sheared off by the cutting edge as the caisson sank under its own weight was rolled towards the center of the 6-ft-high "work chamber."

Vertical holes—approximately 10 ft in diameter and spaced evenly in plain view—were left in the caissons. Through these holes, 16 in the large and 6 in each of the smaller caissons, material was excavated from beneath the caissons by means of 1½-cu yd clamshell buckets handled by full-revolving cranes. Forms were designed and fabricated to be usable from one caisson to the next with only minor alterations.

OPEN CUT EMPLOYED

All the caissons were formed in a 15-ft-deep open cut to reduce the height required for each caisson and eliminate unnecessary sinking. The depth of this open cut was limited by the stability of its banks and the reach of the relatively heavy cranes which worked along the top of the banks. The height of the concrete portions of each caisson was determined by an economical balance between the volume of concrete, area of formed surfaces and the weight required to make the caissons sink. This was determined to be 35 ft for the center and 30 ft for the end caissons. For both the large and middle caissons, height in addition to the concrete section was provided for each by an attached cofferdam. This was installed when sinking had progressed until the top of the concrete was at ground level.

Each cofferdam consisted of steel-beam and timber bracing within walls of steel-sheet piling, and was of the same outside dimensions as its caisson. These cofferdams were removed after the slope was constructed within the caissons and as backfilling of the caissons progressed.

As soon as this soft-ground portion of the slope was accepted by Peabody, the company's crews started driving downward toward a meeting with those advancing upward. Holing-through occurred near the mid-point.

SPIC-AND-SPAN FACILITIES are a striking feature of Mays' operations. Approaches to tipple (left) are paved to prevent 15-ton trucks from rutting the area. Scalehouse (right) houses one of the company's eight two-way radio sets.

RADIANT HEATING in the new shop will provide ideal working conditions and protect spare parts against corrosion. The roof will carry a few inches of water for summertime cooling, and downspouts are inside to prevent winter freeze-ups.

JAMES A. MAYS, owner, provides good working conditions —then insists on workmanlike performance.

COMPANY AIRPLANE, piloted by Chas. M. Logue, saves many equipment shifts by making swift errands for parts.

Pennsylvania bituminous operator, Mays Coal Co., again proves that . . .

Neatness Pays Off

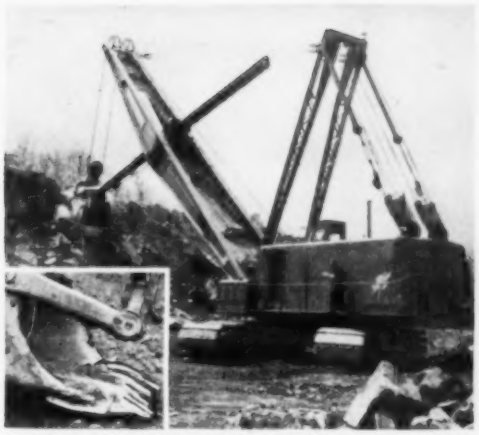
"No, it isn't eyewash," says James A. Mays, in pointing out how radiant heating, pleasant offices, radio communication, private-plane transportation and strict equipment maintenance actually contribute to higher operating efficiency.

A LEADING CANDIDATE for top honors as the neatest property in the coal industry, the Mays Coal Co., Clarion Pa., holds this estimable position because the sole owner and general superintendent, James A. Mays, insists that equipment be kept in "new" condition, and then follows through by providing clean, comfortable facilities at his deep and strip mines. If the word "comfortable" needs expansion, Mr. Mays expresses it this way:

"For publication you might say: We spend a big chunk of our waking lives either in the offices or in the field, so we cater to our natural preference for the comforts and cleanliness of home. But, off the record, we think it's economical to operate this way because we can find what we're looking for a darn sight easier around an uncluttered property, so we have to buy fewer duplicate items; we squeeze more work out of our equipment and lose fewer shifts by keeping it in top condition, and a saved shift can buy a lot of this comfort you see; and, last but not least, we all work better in these surroundings. Come to think of it, you may as well put that in your magazine, too. I'm an on-the-record man, myself."

What are the comforts? Well, the company's new office at Clarion features wall-to-wall carpet and mahogany and walnut paneling in the executive area, inlaid flooring in the more heavily trafficked offices, modern furniture, radiant heating and engineered lighting.

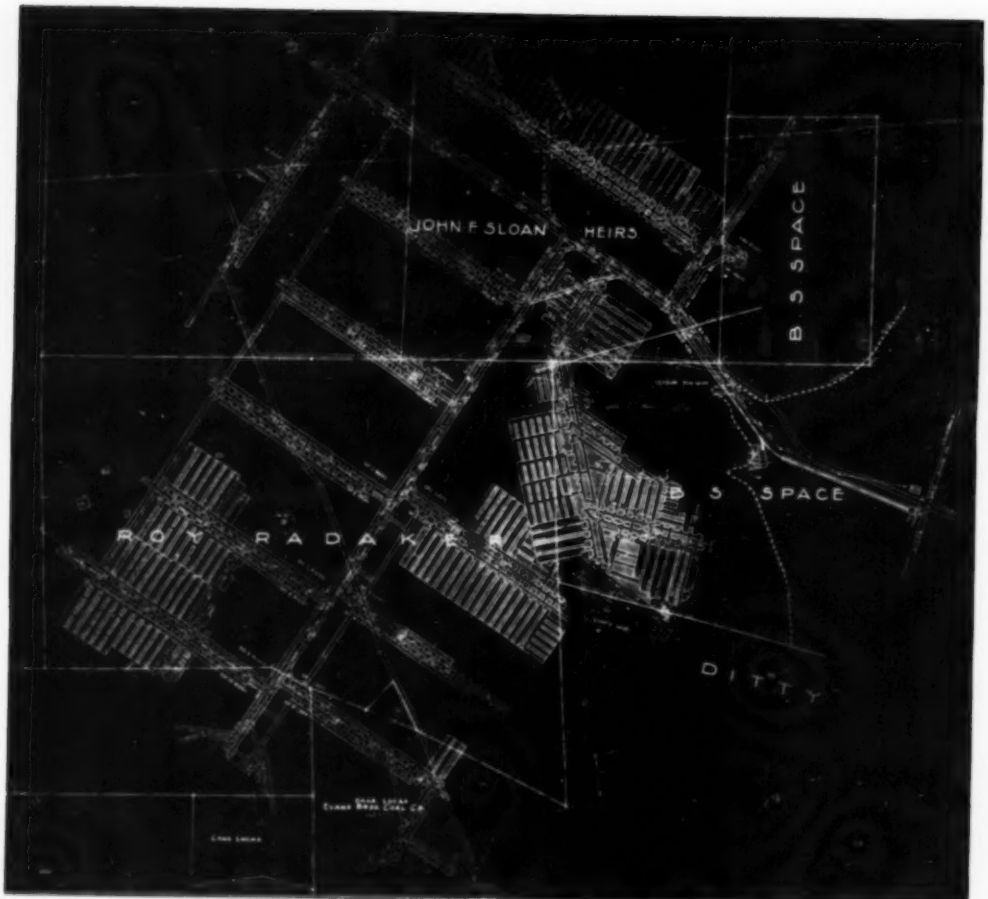
The new shop and supply room, now under construction near the center of operations about 6 mi south of Clarion, will have a radiant-heating system, as will the approach apron in front of the main doors. The building is a double-wall, concrete-block structure with insulation between the walls. For summer cooling, the roof is built to hold a few inches of water that will cool the interior of the shop as it evaporates. Downspouts are inside the building to eliminate their freezing in Clarion's cold winters and to minimize replacement costs.



EFFIGIENT 4-YD STRIPPING SHOVEL has a bucket equipped with self-sharpening throwaway teeth (inset), which are designed to crowd bucket into the material.

LOADING SHOVEL, with 2-yd bucket, loads coal out of 60-ft-wide cut in two passes. Trucks travel on the coal.

NEW OVERBURDEN DRILL sinks 6¼-in blastholes through hard sandrock and shale at the rate of 1 fpm.



NEATNESS is a mark of Mays deep mining, too. Rooms are necked during development to permit rapid production increases when the market demands more coal.

HAND-LOADED CONVEYORS and mine cars hauled by battery-powered locomotives provide transportation.

MAIN OFFICE at Clarion, Pa., aside from amazing visitors, provides radio-system nerve center for field operations.

STAFF includes Norma Jean Snyder (left), stenographer; Chas. M. Logue, office manager, and Elizabeth Confer, chief clerk.

The tipple and scalehouse also carry out the neatness theme, as shown in the photos. Both buildings are covered with galvanized steel siding and the area around both facilities is macadamized or paved with concrete to eliminate mud in the wet seasons.

At the deep mine, the change-room is equipped with individual shower stalls, a water purifier and a Peda-Spray sanitizer, which prevents the spreading of athlete's foot among the miners. Inside, the mine is what you would expect. Entries are straight and smooth ribbed. Development has not been neglected—witness the number of rooms necked to a depth of 15 ft during development to permit fast installation of conveyor drives when the market wants coal in a hurry.

At the strip mines, only new equipment is used, with frequent washing and painting keeping it that way. Even a fender crease on a pick-up truck is professionally repaired as soon as possible.

A Motorola two-way radio system keeps snarls out of the operations. Transmitters and receivers are installed at the office in Clarion, in Mr. Mays' automobile, in two jeeps, in each of three shovels and in the scalehouse, so each unit is only seconds away from advice or assistance. The 60-w units have a range of about 75 mi, depending upon the position of the transmitter.

Topping all this, no pun intended, is a Piper Super-Cub airplane, which in conjunction with the radio has saved a number of shifts in the stripping by getting parts to the job from Pittsburgh suppliers in a short time. Whenever possible, sturdy parts are packaged by the suppliers to permit them to be dropped at their point of use, thus saving more time. Chas. M. Logue, office manager, doubles as pilot of the 125-hp craft.

IS ALL THIS NECESSARY?

"Is it 'eyewash,' Mr. Mays?"

"No, it isn't eyewash. Look at it this way: We would have to spend a lot of money to build any of our buildings, jerry-built or otherwise, or do any of the things we do. We just figure on spending more to do a job our way, then recouping the difference in greater efficiency and savings that result.

"For example, the radiant heating in the shop and storeroom might be considered a luxury, but if it prevents a few bearings on our shelves from rusting, and you can multiply this by the hundreds of items we carry in stock, you can see that over the years radiant heating will pay its way.

"Another example? Take the paving we've done around the tipple and scalehouse. It not only keeps trucks out of the mud, and daily battling with hub-deep mud never did benefit a truck, but it also makes for a faster round trip between the pit and the tipple. Savings of a few minutes per trip can add up to a respectable number of extra trips in a month, which makes the cost of the pavement no burden at all.

"But here's our No. 1 reason for doing the things we do: We like it this way—it makes us feel good."

STRIPPING OPERATIONS

Two-thirds of the company's annual production of about 250,000 tons is produced from strippings in the Lower Freeport and Lower Kittanning.

A 4-yd Manitowoc Model 4500 stripping shovel and two 2-yd Manitowoc 3500's for loading are the major units in the strippings. Far from minor, however, are a new Joy Heavyweight Champion overburden drill (*Coal Age*, February, 1951), a 17-yd Bucyrus-Erie scraper, three International TD-24 'dozers and an Austin-Western Model 99 road grader with 4-wheel drive and steer. The scraper and 'dozers remove soft material down to the rock as each cut is opened, work with the grader in building and maintaining roads and perform their usual duties in the pits.

For cleaning the surface of the coal prior to loading, the company employs an International broom to sweep the refuse into windrows which are picked up and spoiled by a Hough Payloader.

Here's how the coal lies and how it is stripped:

The Lower Kittanning, deepest

TRACTOR-MOUNTED BROOM and high-lift loader are cleaning team for removing dirt from the top of the exposed coal. The broom sweeps dirt into windrows which are picked up and spoiled by the fast high-capacity loader.

MINERS' WASHROOM at the deep mine features individual shower stalls, water purifier, foot spray and cleanliness.

NEW 4-WHEEL DRIVE road grader cleans coal ahead of the broom and builds roads in the pits.

seam in the area, averages from 30 to 54 in thick. The seam is stripped until the cover reaches a depth of from 60 to 70 ft, the remainder to be recovered by deep mining. The bottom is fire clay and the cover is soft gray slate which can be dug by the stripping shovel.

To expose the coal the Manitowoc 4500 makes a 60-ft-wide cut in one pass, this stripping unit having enough reach to make a cut of this width without rehandling spoil. Two bulldozers work with the shovel to keep the highwall trimmed for faster bucket loading and to move spoil as required.

As shown in the illustration, the bucket of the 4500 is equipped with self-sharpening, throwaway teeth, manufactured by the H. & L. Tooth Co., Montebello, Cal. The teeth, which appear to be installed upside down, crowd the bucket into the dirt, sharpen themselves in the digging process, require no rebuilding, can be quickly changed and can be economically discarded when worn out.

Loading is done in two passes, with the haulage trucks operating on top of the coal because of the difficulties presented by the fireclay bottom. A fleet of 12-15-ton International trucks, sold by Mr. Mays to two of his employees, J. F. Hartle and J. W. Reinsel Jr., haul the coal to the tipple. Messrs. Hartle and Reinsel now have their own business with Mays Coal Co. as No. 1 customer.

The strippings work two 9-hr shifts per day. The 4500 moves about 5,000 cu yd of Lower Kittanning overburden in the two shifts.

Geologically, the Lower Freeport is about 125 ft above the Lower Kittanning. It also has a fireclay bottom, but the cover is blue shale and sandrock, both hard. Seam thickness averages 4½ ft. Lower-quality seams, the Middle and Upper Kittanning, lie between the two seams being worked.

Since the purchase of the new Joy drill, Mays' operators have been able to tackle the hard cover of the Lower Freeport and to work to greater depth than others in the Clarion area. The drilling rate in from 40 to 50 ft of the sandrock and shale overburden is about 1 to 3 fpm for a 6¼-in hole. In a single shift of operation this drill achieved 752 feet of hole in solid sandrock.

The holes are drilled in a five-spot pattern, with the holes in each row from 20 to 22 ft apart and the rows on 15-ft centers. Holes in alternate rows are staggered to create the five-spot pattern. Atlas Rockmaster shooting is the rule, each row having the same detonation timing but with short

1952 EFFICIENCY IN AN "OLD MILL" SETTING—Steel-covered compact tipple has double hopper with variable-speed feeders to permit blending.

delays between rows from the face of the highwall to the back of the cut.

A normal shot is about 200 holes, each hole having about 150 lb of explosive in 5-in cartridges.

For servicing the major units, the company has six Jeep trucks and two Dodge Power Wagons. A Jaeger 75-cfm air compressor supplies power for pneumatic coal drills, impact wrenches and paint sprayers. Three 3-in Barnes centrifugal pumps keep water under control.

Since the company operates two pits, it is a standing rule that stripping and loading be separated to prevent equipment snarls. While the 4500 strips in one pit, the 3500 loads coal in the other. One of Mr. Mays' reasons for selecting shovels is their flexibility in tramming. They are assisted by the bulldozers in moving from pit to pit.

The stripping crew totals 20 men under the direct supervision of Mr. Mays.

DEEP MINING

The Lower Kittanning is deep-mined when the overburden becomes too deep for stripping, as noted. Because of variations in the thickness of the seam, Mr. Mays decided that hand-loading into conveyors would be the most efficient method of recovery. Therefore, basic mine equipment includes six 15-in Joy chain conveyors, six Goodman 512 cutting machines with 9-ft bars and Chicago Pneumatic coal drills. Three Greensburg battery-powered locomotives, two 4-ton units for gathering service and a 6-ton unit for the mainline, haul the coal in 3-ton bottom-dump mine cars.

A force of 25 men working a single shift produces about 250 tons per day.

The main opening is a double-heading drift in the seam from which butt entries are turned right and left on 1,200-ft centers. Room entries, turned at right angles from the butts on 500-ft centers open room panels, as shown in the map.

Rooms are driven in pairs 35 ft wide on 45-ft centers halfway through the panel, and the 10-ft pillar is immediately extracted as the rooms are retreated. This idealized system is modified when severe rock rolls or poor coal is encountered.

The mainline locomotive hauls the cars to a surface hopper where trucks are loaded for the 4½-mi highway haul to the tipple. Carloads of rock are discharged to a refuse truck which is parked in a bay under the haulage road ahead of the coal hopper. When the truck is loaded the rock is hauled to the spoil areas in the strippings for disposal.

OPERATIONS AT THE TIPPLE

The tipple, designed by Mr. Mays, is arranged for 4-track loading on the New York Central R.R.

In brief, the coal is handled as follows:

The 15-ton trucks dump the coal into a hopper from where it is fed to the 48-in-wide, 130-ft-long feed belt. The R-O-M. is hand-picked under fluorescent lighting at the top of the belt which discharges the picked coal to a 24x36-in single-roll MacLanahan & Stone crusher. The crusher product is sized on shaking screens into egg, nut, pea and minus 1½-in slack, each size discharging through a chute into a railroad car under the tipple. The major product is mine run crushed to 1¼-in.

Outstanding features of the tipple are the receiving hopper and the feeding equipment for the 48-in belt. The hopper has two side-by-side compartments, each with a variable-rate apron feeder at the bottom. Trucks may dump to either side of the hopper, depending upon whether they carry strip- or deep-mined coal or wet or dry coal. The variable-rate feeders then blend the raw coal from the two compartments, thus providing some measure of control over the quality and moisture content of the coal being loaded.

"WHAT NEXT, MR. MAYS?"

In answer to this question, Mr. Mays said, "More often than not, in the coal business, you have to decide whether to plunge a little deeper or get out. We've decided to go a little deeper by putting up a washery to make sure our coal doesn't lose favor in the marketplace. So come back in a few months and we'll have another subject for your camera."

★ ★ ★ ★ ★

Fast Comeback—Ministerial Division

The old circuit riders—and their few modern descendants—rendered a real service on their rounds, which were made at considerable personal inconvenience and some hazard from storm, flood and chicken every day. Not the least of their trials were certain parishioners more charitably described as "characters." But the circuit riders usually knew the answers. The story goes that one such good man met one of these characters one day who spoke carpingly of the latest sermon and had several other somewhat critical observations to make. Finally, as he was turning away to continue his work, a thought struck him:

"Say, did you tell that man who just moved in down the road that I was a cantankerous old sour-belly?"

"No," replied the preacher, "I didn't. I don't know how he found it out."

★ ★ ★ ★ ★

DUCKBILL will load where man can shovel. Power swing eases movement.

Mechanizing The Small Mine

Conveyors for 300 to 350 tons

BUGDUSTER automatically piles cuttings and leaves clean kerf.

FROM MINE TO TIPPLE by belt not unusual for new operations.

WITHOUT the knowledge that naturally would be available when considering a specific operation, estimates and other conclusions necessarily must be general. In other words, arriving at a fair estimate of the production cost to be achieved would require detailed knowledge of many factors, such as, height of coal, grades, character of the roof and so on. All these and other characteristics have a major bearing on the result that may be achieved and consequently on cost.

When considering mechanizing an old or new mine for 300 to 600 tpd, I believe the basic considerations can be listed as follows:

1. Steady production every day. Many of the small mines will sell to truckers. When no coal is available at the bin, truckers go elsewhere. When this is the condition, it would, to my way of thinking, rule out trying to produce the entire tonnage with one loader, although operation with one loader would result in lower cost per ton.

2. To keep one loader going fairly steadily would necessitate carrying a very large and expensive stock of parts, which would almost double the investment cost, since it takes practically as many stock parts to assure continuous operation for one loader as it would for three or four.

3. The cost of equipment would prohibit carrying standby machines—loaders, shuttle cars, etc.

4. Small-tonnage mines can and usually do have better labor.

5. Small-tonnage mines can always have better supervision because the manager is underground with his men. Also, he can always get one good fore-

HOW SUCCESSFULLY can a small mine be mechanized, what would it cost, and what would it provide in the way of results? By a small operation is meant one producing 300 to 600 tons per day.

By C. E. McWHORTER
Mining Engineer
Goodman Mfg. Co.
Chicago

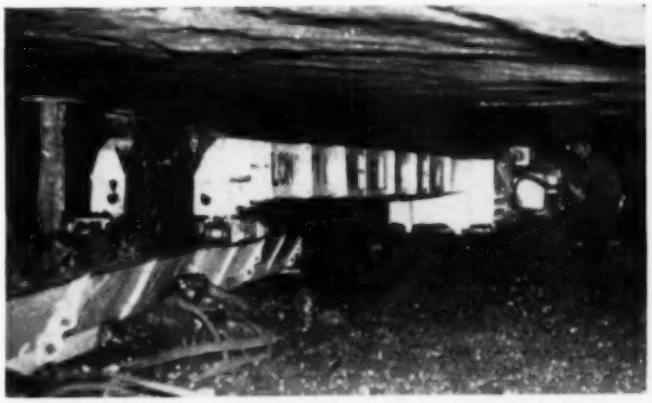
SWINGING HEAD on loader provides wide cleanup with minimum moving.

Loaders for 500 to 600 tons

man or superintendent who can and will spend all day underground, especially if he participates in the earnings, which is common practice.

6. All coal should be produced on *one* shift. This simplifies supervision, handling of supplies and maintenance of equipment, in addition to eliminating lost motion involved in changing crews and reducing the labor for certain services involved in multiple-shift operation.

As I see it, then, regardless of the height of the coal up to, say, 5½ ft, or the pitch (under 20%), the best system would be full conveyor from the face to the tipple. Also, the production should come from several room and heading faces, and should be loaded by several small-capacity machines for flexibility and avoidance of severe penalties as a result of breakdown or trouble in individual places. In line with these considerations, I feel that two general systems are best suited to high efficiency at small operations:



BRIDGE CONVEYOR provides continuous transportation for efficiency.

PANEL BELT moves coal quickly and smoothly for room units.

1 CONVEYOR MINING

For 300 to 350 tons per shift, I would proceed on the basis of shaker conveyors with power-swing duckbills discharging to a 30-in panel belt. If the mine is new, the belt should go all the way to the tipple. If it is an old operation with a long haul, belt investment becomes high and track haulage is indicated. Three thousand feet is about the limit with belts.

Equipment for the system and approximate investment is about as follows:

3 room shaker conveyors with pow-

er-swing duckbills with a capacity of 75 to 100 tons each per shift @ $11,500	$34,500
2 entry-development shakers with duckbills @ $11,500	23,000
5 shortwall cutting machines with bugdusters and hand-held drills @ $10,500	52,500
1 1,200-ft 30-in belt conveyor and belt	36,000
Total investment	$146,000
Yearly production, 250 shifts, tons	90,000
7-year depreciation cost, per ton	$0.185
Interest on investment at 5% with 20% salvage value after 7 yr, per ton	$0.013
Total capital charges, per ton	$0.20

Labor required underground should total about 26 men. One breakdown is as follows:

Foremen	1
Section bosses-shotfirers	1
Facemen (cutters, drillers, loaders)	15
Underground mechanics	1
Timbermen and supplymen	2
Beltmen	1
Motormen	1
Electricians	1
Mine maintenance-pumpmen	3
Total	26

Total wage cost @ $23 per shift, including 30c per ton for welfare and 10c for fringe benefits, per day $597

Total tons produced	350
Labor cost per ton	$1.71
Capital charges per ton	$0.20
Total labor and equipment cost per ton	$1.91
Repair parts per ton	$0.06
Moving equipment per ton	$0.05
Mine supplies per ton	$0.40
Power per ton	$0.08
Total per ton to the portal	$2.50

2 LOADER OPERATION

For 500 to 600 tons per shift, I would consider low-capacity crawler-mounted loaders in combination with bridge conveyors and room conveyors discharging to a panel belt. Two complete set-ups would be required for room and pillar extraction and development.

Equipment required would be approximately as follows:

4 bridge conveyors, 4½ tpm, @ $4,730	$18,920
4 350-ft chain conveyors, 4½ tpm, @ $9,140	36,560
2 crawler loaders, 5 tpm, @ $24,000	48,000
2 shortwall cutters with bugdusters and drills @ $10,500	21,000
2 crawler-type shortwall trucks	17,000
1 1,200-ft 30-in conveyor with belt	36,000
Total	$177,480
Yearly production, 250 days, tons	132,000
Depreciation per ton (7 yr)	$0.154
Interest on investment @ 5%, per ton	$0.027
Total capital charges per ton	$0.181

Underground labor requirements would be approximately as follows:

Loader operators	2
Cutters and drillers	6
Utility men, including conveyor advance	4
Timbermen	4
Shotfirers	2
Foremen	1
Face bosses	2
Beltmen	1
Motormen	2
Mechanics	1
Electricians	1
Mine maintenance men	4
Total	32
Total wage cost at $23 per shift	$735
Tons produced per shift	600
Labor cost per ton	$1.23
Capital charges per ton	$0.18
Total labor and equipment cost, per ton	$1.41
Repair parts per ton	$0.20
Moving conveyors per ton	$0.06
Mine supplies per ton	$0.40
Power per ton	$0.08
Total to the portal, per ton	$2.15

It should be repeated that the preceding are possibilities of how mechanization of a small operation might work out. It is not to be assumed that the exact cost figures can be attained since, as noted, actual results reflect variations in conditions at each particular operation and also the equipment deemed necessary to do the job, including auxiliary units not specifically mentioned. For example, a roof-bolting unit might be added to the equipment list and, while it would increase the capital charges, might reduce the labor necessary for roof support. Therefore, the actual figures might be higher and contrariwise they might well be lower.

In any event, mechanization with the proper type of equipment and operation in line with accepted principles will provide the lowest possible cost, usually well under the average for the industry or the region. Naturally, the manufacturers stand ready and willing to work with all operators of mines, whether large or small, in the attainment of this goal.

★ ★ ★ ★ ★

Who Did It When

As far as we know coal was mined and used in this first fossil-fuel age only by the patient Chinese (1,100 B.C.).

Hand-dug wells were drilled near Oil Creek, Pa., by a mysterious race of Indians who preceded the Algonquins.

In the 13th century A.D., the British coal trade became active. About the same time, coal became an important resource for the Hopi Indians in what is now Arizona.

In 1306, King Edward I made it a capital offense to burn coal because it has been found that the gases of combustion were poisonous. At least one man was executed for burning coal.

In 1587, when Mary Queen of Scots was beheaded by Queen Elizabeth, coke was coming into use for house heating, and in 1620, when the Pilgrims made their historic voyage on the Mayflower, British Patent 15 was issued for the coking of coal.

The first bituminous mining took place in North America in 1730—in Virginia.

Only 22 tons of anthracite was mined in the United States in 1814, and only 300 tons of bituminous in 1820. Twenty years later, both had passed the million mark.

In 1860, the Lucesen oil-shale plant, near Pittsburgh, importing shale from Canada and using cannel coal, was retorting 1,000 bbl of oil per day and selling it for $30 to $40 per barrel.

The first large-scale use of natural gas in the United States occurred in Pittsburgh in 1884. The gas was piped from the Murraysville field, some 14 mi away, for both lighting and industrial heat.

Energy Sources,
McGraw-Hill Book Co., Inc.

★ ★ ★ ★ ★

LUMP-COAL PRODUCTION is provided by special head first cutting a "millstone" and then wedging to break it up.

High Capacity and Easy Moving Feature . . .

New Coal-Recovery Drill

Range: 36-in holes 120 ft deep

Capacity: 250 to 300 tons per shift

Portability: Readily trimmed for towing

Maneuverability: Self-powered hole moves

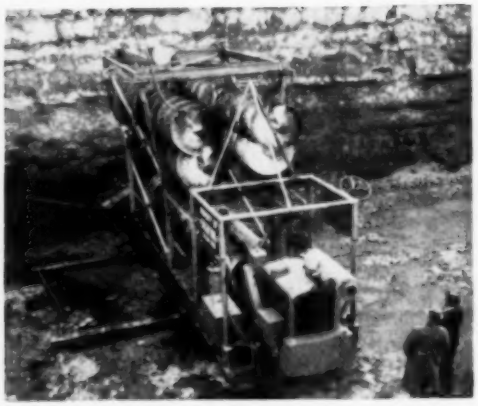
LONG AUGER SECTIONS, each 24 ft, are stored on racks in top of machine, here raised to full working height.

RATED PRODUCTIONS of 250 to 300 tons per shift are being obtained with a new-model coal recovery drill which began receiving its field tests in April of this year. Even though of high capacity and with power to drill a 36-in hole 120 ft deep, the machine is designed so that it can be moved on the highway as a semitrailer behind a truck. Working in the pit, the machine is advanced from hole to hole under its own power.

The new unit is the Type 36-24 McCarthy coal-recovery drill developed by the Salem Tool Co. Standard equipment consists of five auger sections each 24 ft long. Four are stored on racks in the top of the machine. They are handled by a bridge crane with two hooks operated by hydraulic power. In moving up for the next hole the machine rides on a pair of steel skids 14 ft long, enough length for drilling two holes. Travel of the machine feed carriage furnishes power both for moving the machine on the skids and also for advancing the skids. This is done by hoisting the lead-section auger so that the carriage can pass underneath, attaching a wire rope to the carriage, and hooking this rope over a sheave.

To move the skids ahead the machine is raised on its hydraulic jacks (3-ft travel) and the haul rope hooked

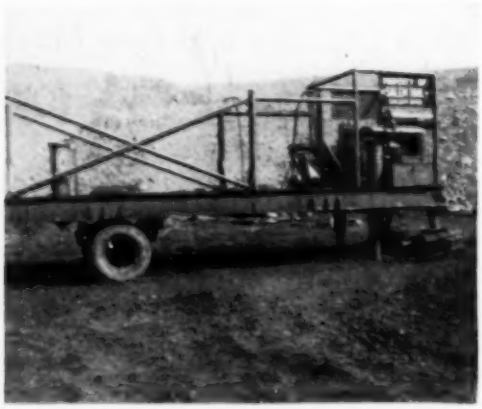
SKIDS shown under machine at full working height are long enough for drilling two holes.



READY TO MOVE to new hole, auger is retracted and machine lowered to steel skids.

Skid mounting for rapid hole moves and easy haulage by truck

AUGER RETRACTION is shown here in last stages after completing hole in highwall.



AIR-BRAKE DOLLY handles towing after crane frame and auger rack are removed to reduce clearance.

to the cross rod at the rear end of the skids. To move the machine ahead it is let down so its four rollers rest on the skids. Then the haul rope is hooked to the tie rod at the front end of the skids. An alternative is to anchor a long wire rope to a "dead man" several hundred feet ahead. For advancing the machine, the carriage pull rope would be hooked to this stationary rope and for advancing the skids the carriage pull rope would be threaded through a single rope block or pulley anchored to the stationary rope.

TOWING PROVISIONS

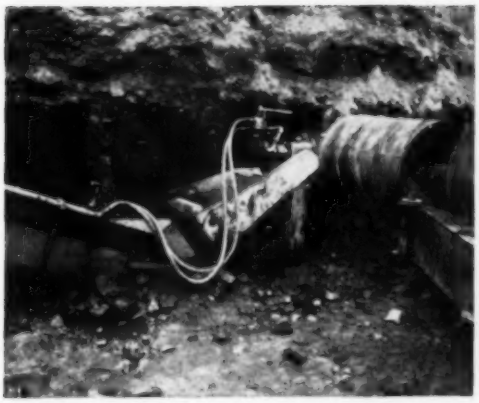
To make the machine portable for highway travel, the drag-flight conveyors are entirely separate. One conveyor, 8 ft long by 4 ft high, lies on the ground under the auger and discharges to a 35-ft rubber-mounted conveyor elevating to the trucks. On a move to the next hole, the machine pulls the 35-ft conveyor and pushes the shorter conveyor ahead of it to achieve the change.

Power for the conveyors is supplied by a 25-hp Wisconsin VF4 air-cooled gasoline engine mounted on the large conveyor. That engine also drives a hydraulic pump supplying power to a hydraulic motor on the shorter conveyor.

The auger is driven by an 87-hp GMC Model 4071 diesel mounted on the feed carriage and equipped with silent-type muffler. Next in the drive train is a 3-speed transmission with reverse. Following is a gear reduction with cast-steel case, Timken bearings and heat-treated gears and shafts. The auger chuck is alloy steel.

Carriage travel—that is, the auger feed and retraction—is accomplished by two power-driven chain sprockets on the carriage and traveling along roller chains stretched on top of the frame to form rack rails. There is one chain on each side and each one is double-strand roller type.

The sprocket shaft is driven by a hydraulic motor powered by one of two pumps connected to the 87-hp diesel. The drive connection from the hydraulic motor to the sprocket shaft is a worm and gear cone. By fingertip control, any speed up to 6 fpm is available for the advance but the



ELEVATING CONVEYOR (left) and short hydraulic-drive unit load coal mined by auger head.

AUGER HEAD makes 36-in rim cut, using underground-type bits, with pilot hole by 6½-in drill bit.

mark new-type high-capacity coal auger

HARD PARTING 2 in thick cut near seam center is shown by V. J. "Vin" McCarthy, drill developer.

auger can be retracted at any speed up to 30 fpm.

The other hydraulic pump operated from the main engine supplies power for hydraulic motors driving the hoist and travel of the overhead crane. During the drilling cycle this pump is disengaged to save power and reduce heating of the oil.

HEAD DESIGNED FOR LUMP

The lump-coal-type cutting head, which is a barrel 4 ft long, is permanently attached to the lead auger. The rim cut is made by renewable tungsten-carbide bits of the same size used on underground coal cutters. The center, or pilot, hole, 6½ in in diameter, is cut by a Kennametal head of the standard type used for strip-mine overburden drilling. It leads the rim cut by 10 in. Back of the pilot is a cone or wedge which breaks the successive "mill stones" of coal as they are cut. As can be seen from the photographs of operation in Pittsburgh No. 8 coal, the mined product includes a considerable percentage of lump.

TRIMMING FOR TRAVEL

Ready for travel on the highway the machine is 8 ft wide by 32 ft long. When trimmed to these dimensions, the skidding rollers are removed and the top structure, consisting of crane frame and auger rack, taken off. By removing bolts, this structure, which is considerably wider than the base of the machine, is disassembled into sections convenient to handle. The corner posts are removed by pulling them out of pipe sockets that stay on the machine.

To complete preparations for a long move or highway travel, the machine is raised to the full 3 ft by the built-in hydraulic jacks and then a dual-wheel air-brake-equipped dolly is set under the front or highwall end. A truck tractor is then backed under the other end and the fifth wheel engaged. The four tires of the dolly are 9:00 by 20.

Weight of the machine, without conveyors, is approximately 25 tons. That includes the auger sections at about 1 ton each.

V. J. McCarthy, field representative for the Salem Tool Co. and developer of a long line of strip-mine drills, recommends a three-man crew for the machine and expects that in regular operation they can mine and load into trucks 250 to 300 tons of coal per shift.

A Federal Problem Too?

"One out of six government office workers is injured each year."—*Bulletin prepared by the Federal Interdepartment Safety Council and issued over the signature of Maurice J. Tobin, secretary, U. S. Department of Labor, April, 1952.*

Should there be a new law providing for inspection and shutting down of dangerous government offices?

The U. S. in 1975: Bigger Still—But Strong Enough?

Probing needs and resources, the Paley report answers these questions:

How big will the Nation be in 1975?

Can we find enough raw materials?

Where will the energy come from?

Can technology provide strength and abundance?

GROWING SHORTAGES and mounting costs of basic raw materials cast grave doubts on the Nation's future security and threaten to lower our living standards. But technology, wisdom and initiative within our country and solidarity among the free nations can solve the problem.

Those are high spots of the report of the President's Materials Policy Commission, headed by W. S. Paley, president, Columbia Broadcasting System, after an 18-mo study. The report was handed up to the President June 2, 1952, and was released to the press June 23.

The commission's report comprises five volumes, a total of over 800 pages. The running title is *Resources for Freedom*. The five volumes are subtitled as follows:

1. "Foundations for Growth and Security."
2. "The Outlook for Key Commodities."
3. "The Outlook for Energy Sources."
4. "The Promise of Technology."
5. "Selected Reports to the Commission."

The complete report is sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price is $6.25.

Here's what the Paley Commission sees ahead for the United States in 1975, compared with 1950:

	1975	1950
Population	193,000,000	151,000,000
Working force	82,000,000	62,000,000
Gross national product (1950 dollars)	$566 billion	$283 billion
Materials consumed	4.0 billion tons	2.7 billion tons
Electric power produced	1,400 billion kw-hr	389 billion kw-hr

In addition, the commission expects that between 1950 and 1975 demand for minerals—metals, non-metallics and fuels—will rise about 90%; timber, 10%; agricultural products, 40%; energy, 100%; industrial water, 170%.

Absolute shortages are not the real threat, the report argues. The actual threat is rising real costs, the hours of work and units of capital needed to produce materials and energy. Thus far, the real-cost trend has been downward because we've been using our richest resources. As we turn now to secondary resources, real costs inevitably will rise.

ENERGY—KEY TO STRENGTH

On energy expansion, even without war, the commission sees a need for some 1,400 billion kw-hr by 1975, an increase of 260% over 1950. Demand for liquid fuels will more than double; for natural gas, triple. Coal demand will be up about 60%. The report continues: "All signs point to a re-emergence of coal in stronger and stronger demand, as supplies of petroleum and natural gas inevitably begin to decline and grow more costly . . . and new technologies show how to create synthetic liquid and high-heat gaseous fuels out of coal resources at costs competitive with natural supplies."

To meet the overall materials problem, the commission sees three paths, namely:

1. Increasing our usable domestic base—This means new searches for materials within our own borders and more efficient extraction. The report points out that we abandon half of our commercial-grade coal and over half of our petroleum underground and that, in 1950, we wasted enough natural gas to warm 11,000,000 homes.

2. Altering use patterns—Flexibility in substituting abundant for scarce materials (aluminum for copper, for instance) plus elimination of waste (automobiles exhaust to the atmosphere 125,000 tons of lead per year because drivers want quick pick-up in traffic) will help. Technology also must play a big role. That means more scientifically trained persons and a wide expansion of basic scientific knowledge, both of which now are below par. Too much money proportionately is being spent on weapons, which consume materials, and not enough on projects that sustain and increase resources.

3. Getting more from imports—By 1975, we may have to import 20 to 25% of what we need. This may be advantageous: "The hard political facts of mid-twentieth century add further great weight to the proposition that it will be to the mutual advantage of all freedom-loving peoples of the earth to achieve a greater measure of economic and political cooperation than ever before, founded on the principles of mutual help and respect."

SOLVING OUR PROBLEMS

What's to be done?

The commission made many recommendations. As far as coal men are concerned, the following top the list:

1. The government should make a continuing study of synthetic liquid fuels from oil shale and coal, relating the studies to national-security needs and the outlook for petroleum.

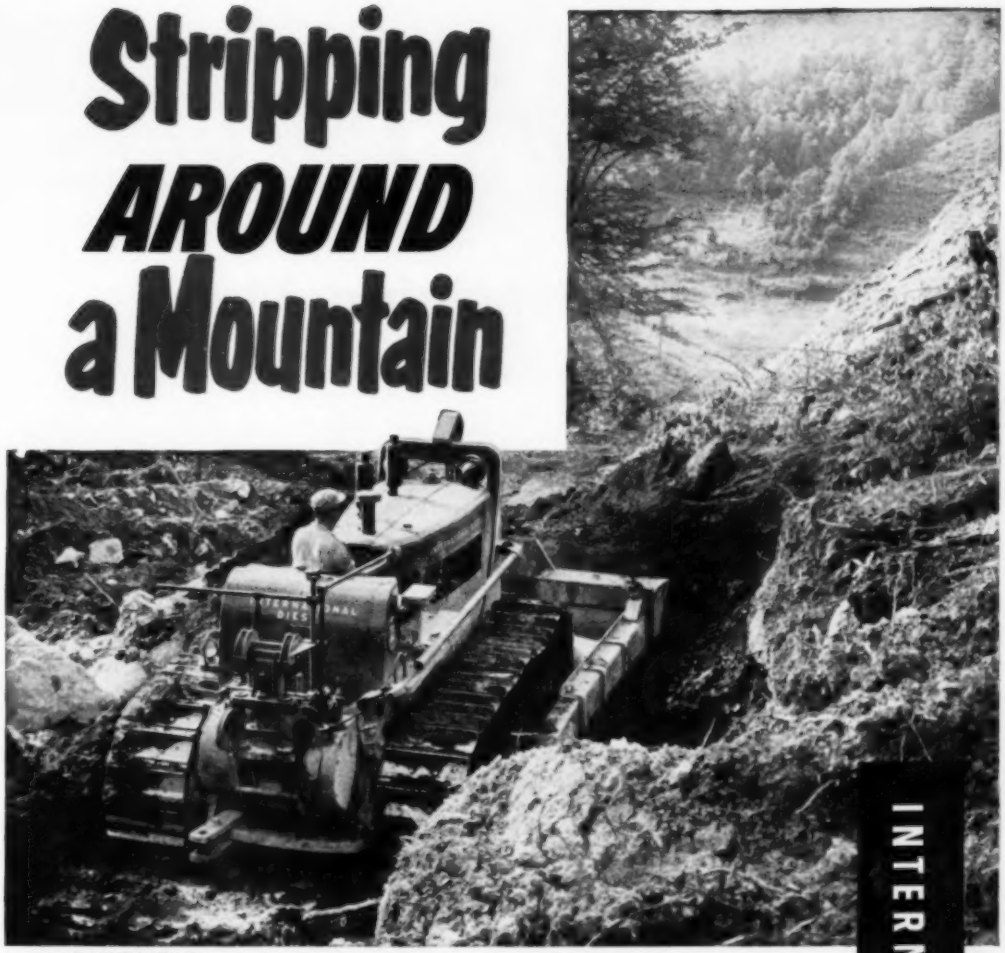
2. The government should give limited financial help to private companies in producing oil from shale. Small plants should be built as soon as possible.

3. Cooperating with industry, labor and research organizations, the government should shape a strong program to advance coal technology.

4. Remaining hydroelectric potential should be developed as rapidly as possible.

5. Cooperation between the Atomic Energy Commission and private utilities for developing electric power should be speeded.

Stripping AROUND a Mountain



THE CHAMP DIGS IN on the Meade Fork operation, where Dick Construction Company is strip mining for the Clinchfield Coal Corp. International's exclusive Planet Power Steering means pivot turns, feathered turns, turns with power on both tracks. 8 speeds forward, 8 reverse, with a shift up or down one speed without declutching.

How West Virginia mine operators strip the coal with International's "Big Red" TD-24

Down in the rough mountain country of Virginia and West Virginia, there's high-grade coal aplenty in seams up to ten feet thick. And the Dick Construction Company uses five International TD-24s to get at it.

They start stripping on a mountainside where a seam outcrops, and work around and around the mountain till they've stripped off the overburden to a depth of 50 to 60 feet. It's rough, tough, demanding work, where the TD-24 is the Champ for sure.

One reason is the TD-24's maximum of 148 drawbar horsepower, more than any other crawler. The TD-24 can take huge bites of dirt and rock. It moves them faster, too, and backs up faster to get in position for another load. It does more work in less time. It moves more paydirt per day.

For the whole low-down on the TD-24, ask your friends who own them. Ask your International Industrial Distributor, too, and ask him about his well-equipped field service, always at your call. Find out all the answers. You'll be a TD-24 man from then on in!

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

Foremen's Forum

Know Your Mining Men

A division superintendent makes a strong case for improving safety by:

1. **Studying your men to spot "walking accidents."**
2. **Watching for letdowns in individual efficiency and alertness.**
3. **Being honest and considerate in working with men.**

By JOHN A. NOON, Division Superintendent
New River-Pocahontas Consolidated Coal Co., Berwind, W. Va.

ASKING A MINE FOREMAN, assistant foreman, fireboss or mine safety committeeman to become a psychologist may seem like adding one more burden to an already heavy load of duties; yet so many accidents stem from psychological causes that today's supervisors can hardly afford to ignore this aspect of safety. The industrial psychiatrist and his colleagues are, of course, qualified to handle scientifically the problems of maladjustment. There are so few of them in coal mining, however, that their time must be allocated to the more serious cases. Therefore, it falls to the lot of mine supervsiors to handle less serious cases, recommending the other to the attention of specialists.

Studies show that factors leading to accidents may be classified in these four categories:

1. A general revolt against mine standards.
2. Physical causes.
3. Permanent psychological causes.
4. Unexpected psychological causes.

Another study of a large group of mine employees, from loaders to officials, indicates that the accident-prone group is characterized by extreme aggressiveness, resentment of authority and generally poor social adjustment.

On the other hand, the low-accident group is characterized by stability, seriousness rather than impulsiveness and generally good adjustment to their social situation. Since these studies were carried out under scientifically controlled conditions, they indicate certain channels into which supervisors may direct their efforts.

Adapted from a paper presented at the West Virginia State Safety Conference, April 1952.

KNOWLEDGE IS POWER

Unless the supervisor is thoroughly acquainted with his subordinates—their backgrounds, home lives, financial difficulties and other problems which affect their ability to concentrate on the job—it is virtually impossible to recognize attitudes that may result in accidental injuries.

Only through thorough knowledge of people can we identify the over-agressive members of the group, the ones who resent authority and the ones whose minds are disturbed by financial and home problems. When a new worker is assigned to the group, the foreman should make every effort to find out as soon as possible the individual's home situation, past accident record, ability to concentrate in the midst of distractions and ability to apply instruction.

Gathering this information should not be considered as unwarranted prying into the individual's affairs. It is an essential part of the foreman's job. Without it he cannot be in a position to assign the individual to work he can perform satisfactorily and safely. Nor can he make even a tentative diagnosis of accident proneness. If those prone to accident can be identified before they do too much harm, and if older workers whose concentration on safety is beginning to weaken can be put back on the right track, we shall see a substantial reduction in injuries.

BE ALERT TO CHANGES

Emotionally, people are not static creatures. The well-adjusted mineworker of today, who is alert of mind and who concentrates on his job, by tomorrow or next week may have developed a psychological disturbance as a result of influences wholly unrelated to the job. Unless the supervisor knows these people thoroughly, he will not be able to detect such changes.

The miner or mine official who generally pays strict attention to his job and turns out work quickly and accurately, but who suddenly begins to "wool gather" or produce an excessive amount of defective work, may be heading for injury through inattention. The man who usually has a cheerful greeting for others, but who comes to work one day in a bad humor, doesn't do so without cause It is worthwhile to try tactfully to find the trouble. Such symptoms are indicators by which an alert supervisor can detect potential trouble.

A CASE HISTORY

A short time ago we had the case of a man whose actions followed this pattern. The assistant foreman visited the room where he worked and without reference to the morning grouch learned that the man had been garnisheed for a furniture bill which he could not pay and still keep up with other family expenses. Further conversation confirmed the foreman's suspicion that the man was over his head in debt. Time payments for his automobile were taking a large portion of his semi-monthly paycheck.

Arrangements were made to consolidate his debts to permit him to make weekly payments suitable to his income. Following this, the man's disposition and job concentration improved.

There is no conclusive evidence that this man could have had an accident if the foreman had not interested himself in the case. But a serious injury was possible since the employee was working in a room that required careful timbering, and he had to be alert to avoid falling rock. The difficulty with a great deal of accident-control work is that we never know with certainty what accidents we have prevented. But this man's efficiency was improved, and loss of efficiency and

one solid source...

HANGERS
Timber, combination and roof types

ROOF BOLTING UNITS
Engineered especially for roof bolting

LOCKTITE CLAMPS
For all shapes and sizes of trolley wire

HARPS, SLIDERS
Slider is supported at contact level for both high and low wire

COMBINATION CABLE & TROLLEY CLAMPS
Trolley wire and feeder (up to 1,500,000 C.M.) may be adjusted independently

SECTION INSULATORS WITH SWITCH

For all sizes of trolley and feeder wire. Available with either quick-break or slow-break switch.

INSULATED J-HOOKS
Hang anything in the mine on this and other shapes of J-hooks

FUSED TROLLEY TAPS

Take two bites on cable, reduce pull-outs to a minimum

"NO-LOSS" EXPANSION BOLTS
Both 4" and 6" cases, ⅝" bolts in various styles

QUICK-BREAK SWITCHES

100 amp to 2500 amp with or without enclosing box

..and the exclusive Elreco Inverted Trolley System that eliminates trolley poles and nips...makes motor operation *safe*...cuts maintenance 90%!

Depend on this *complete* line of trolley material for every type of mine operation. Every product in the line is the best we know how to make. You'll want our new catalog. Write me personally for one.

H. K. McKee PRESIDENT

Serving the Mining Industry since 1892

THE ELRECO CORPORATION

A COMPLETE LINE OF TROLLEY MATERIAL FOR EVERY MINE

2900-18 CORMANY AVENUE • CINCINNATI 25, OHIO

The FACE FOREMAN
by Bud Fox
HOOT-OWL SHIFT
SLEEP-?
YA CAN'T BEAT THE HOOT OWL SHIFT FOR SLEEPING— GUARANTEED 1 HR. OF SOUND SLUMBER EVERY DAY
ENTERTAINMENT-?
THE SHIFTS A GUARANTEED MONEY SAVER—
EAT-?
BROTHER— YA EAT LIKE A HORSE— THERE'S NOTHIN' LIKE A COLD SALAMI SANDWICH AT THREE IN THE MORNING—

lack of attention are notorious accident breeders.

CHECK NON-INJURY ACCIDENTS

There are other ways in which the foreman may be able to prevent accidents by identifying accident-breeding attitudes. For one thing, he should ascertain which members of his group have been involved in accidents and the circumstances in each case. He also should be on the watch for non-injury accident cases, however minor. Examples are excessive wrecking of motors, leaving doors open, delaying the setting of timbers and so on. Such repeated occurrences, while not serious in themselves, often are the key to attitudes which may result in serious accidents.

There seldom is a single cause, or even a small group of causes, which account for accidents in coal mines, but the foreman frequently can observe a pattern in little unexpected occurrences in the work of an individual which will show that he is not up to normal efficiency. Proper analysis and interpretation of these minor accidents and near-accidents may enable the foreman to prevent a major injury through transfer, additional training or counseling. If he is not able to do these on his own authority, he can report the situation to his superior in the chain of command.

These are ways in which the foreman can make good use of psychological techniques, even though he may not call them by that name. He may call the process "commonsense," "good foremanship," or "friendliness and interest," but it carries him to the same goal—a better understanding of his people and the ways in which their personal problems affect performance on the job, especially safety performance.

Once he is fully acquainted with each man, he is in a position to recognize more accurately the conditions and situations which typically precede accidents, and the emotional and physical changes which are indicators of trouble. The action he takes and the promptness with which he takes it may well mean the difference between a good safety record and a poor one. It is up to the foreman, himself.

MEET MEN HALFWAY

Quoting from the article in *Coal Age* (January, 1952), "How to Be a Successful Boss," by Harry Northover, mine foreman, Bethlehem Mines Corp., Washington, Pa:

"Don't make changes affecting subordinates without explaining 'Why.' You would be surprised how often an employee will mistakenly assume than an unexplained reassignment indicates the boss's dissatisfaction with his work.

"If you must criticize, do it privately. Calling down a subordinate in the presence of a fellow employee creates resentment. Don't spy. A sense of privacy is necessary for self-esteem. The impression the boss is breathing down his neck makes an employee tense.

"Issue as few orders as possible, and only those you know you can enforce.

"Don't be a buck passer. Employees respect a supervisor when they know he will stand up for them and not try to slough off responsibility when things go wrong.

"Show an interest in accepting suggestions. A one-man organization is a weak organization, no matter who the man is or how able he is. We can't make all the decisions for everyone around us, we can't watch all the details, we can't do everything ourselves, we can't follow through. We have to learn to let others do something for us; we have to trust them to do what we can't do but we can't expect them to do precisely as we would do. They will make mistakes—foremen and department managers make mistakes. So do general managers, presidents and directors. But for our own sake as well as for the sake of the work . . . we must give other people responsibilities, and trust them to see them through.

"Don't argue. Engaging in a heated debate with a subordinate creates future resentment. As a supervisor, you probably will win your point but lose in the end."

KNOW YOUR JOB

It behooves each supervisor to become well acquainted with all requirements of his job, so he can at least recognize problems and know how and where to find the correct answers that will help him over the rough spots.

Management must not be lax in its efforts to promote the physical and mechanical changes necessary to better conditions in and around our mines. But workmen must be shown the "why" and "how" of such changes.

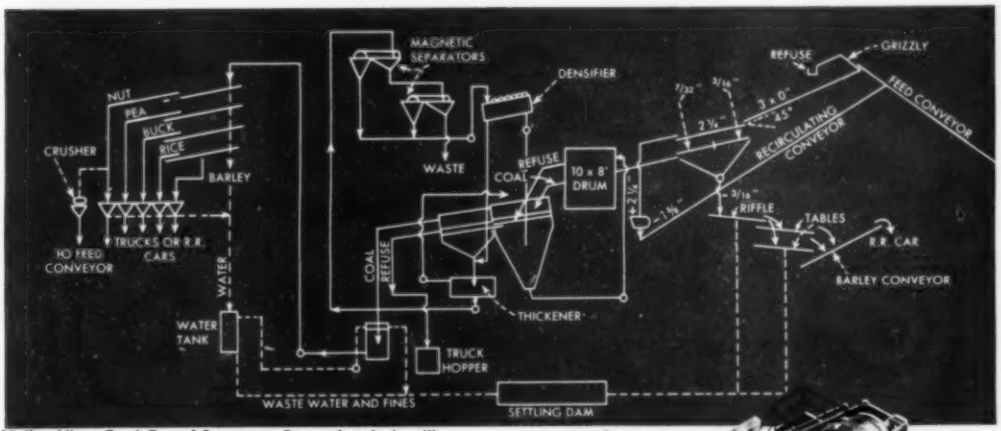
As I see it, there is no coal-mine safety problem that cannot be solved when owners, officials, state and federal inspectors and mineworkers pull together to improve safety.

The passing of legislation, while it supposedly expresses the will of the people, does not always provide the correct solution. Frequently, legislative measures are only superficially conceived, because emotional evaluation of the effect of tragic mine episodes may take precedence over a diagnosis of our problem based on a diligent study of all factors involved.

Mr. R. E. Nelson, President, and Mr. John A. Hart, Jr., Vice-President, Valley View Coal Co.

These Operators know the difference ***clean coal*** *can make*

WEMCO MOBIL-MILL *produces* **PRECISION WASHED COAL** *for prominent Pennsylvania operator.*



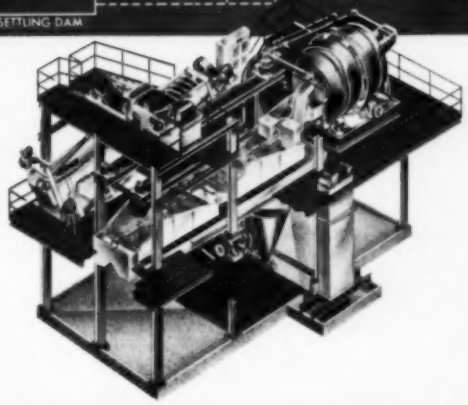
Valley View Coal Co. of Scranton, Pennsylvania is still another coal producer demonstrating the outstanding advantages of WEMCO Mobil-Mills in preparing a finished product of unequaled quality and uniformity.

Employing a No. 4C WEMCO Mobil-Mill with a 10' x 8' WEMCO Drum Separator, Valley View washes 175 TPH of anthracite from refuse banks containing only 15% recoverable coal. Clean coal averages 9% to 11% ash, depending on size fraction.

A complete washing unit installed between the breaking and product disposal facilities, the WEMCO Mobil-Mill provides exceptional accuracy and efficiency of separation for **consistent production of premium coal.**

Mobil-Mills are furnished in capacities up to 420 TPH for washing coal up to 8" in size, and with three types of separators:

1. **WEMCO DOUBLE DRUM** for coals having middling content requiring two-gravity, three-product separation.
2. **WEMCO SINGLE DRUM** for coals less complex.
3. **WEMCO CONE SEPARATOR** for coals in sizes up to 4".



Write today for descriptive Bulletin No. M-3-M-4 and for a WEMCO recommendation on your coal cleaning operations—furnished without cost or obligation.

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Operating Ideas

Analysis of Haulage Accidents Points Way to Mine-Built Shuttle-Car Improvements

THE FACT that "most accidents occur at the starting and stopping points and right after changing seats," as brought out by a careful analysis of shuttle-car accidents, has lead to the rearrangement of controls and other improvements expected to increase safety of shuttle-car operation at the Sonman mine of the EG&FA Coal Div., Portage, Pa.

On the two cars that have been revamped for trial purposes, the brake is now placed so that it is always operated with the right foot and the accelerator with the left. With these controls now similarily positioned at both ends of the car, the operator no longer has to change his thinking or guard his reflexes when he changes seats. In addition, the many operators who "overflow" the small decks have been given more protection with a 6-in flange around the deck that provides added clearance between the deck and road timbers, as shown in the accompanying photo. Another improvement, not illustrated, was the placement of a fire extinguisher in a suitable place.

How these improvements came about, as reported in the company's *Safety News Letter*, is a most interesting part of the story. The company, of course, had long recognized the benefits of shuttle cars and its experience had shown that they could be operated safely—as long as the operator doesn't forget or make mistakes. Yet operators do make mistakes—as fatalities and serious accidents in the past will testify.

Investigating shuttle-car accidents that occurred at Sonman, along with study of fatality reports from other mines, James McCarty, plant safety inspector, found that most of the accidents occurred when the shuttle car was close to the dumping point or close to the loading machine. Serious consideration of this fact led Mr. McCarty to ask himself these four questions:

1. **"Why do most of them occur at the beginning or end of the haul?"** His conclusion was that operators were changing from the process of stopping to starting or from one seat to the other. Only a few seconds before the operator had been using his right foot to stop the car; now he must use his left foot to stop it. When he changed position, he had to change over his mind. If he changed position but forgot to change his mind, he would step on the accelerator instead of the brake.

2. **"Does the changing of controls be-**

BEFORE **SHUTTLE-CAR OPERATOR** had to shift his feet in operating brake and accelerator—and adjust his mind accordingly—every time he changed his seat from one end of the car to the other.

AFTER **RIGHT FOOT** now always works the brake, left foot the accelerator, on both ends of the car. Six-inch flange around deck provides more clearance for many operators who "overflow" seat.

Angular Slotted Bits Drill Longer in Hard Roof

An angular slotted recess in the cutting edge of Kennametal Roof Drill Bits is a new design feature that greatly increases bit life, particularly in hard roof. It also reduces bit "wander". Operators have reported as much as 30 per cent longer footage in laminated sandstone with bits of the new design.

•

Web Core Breakers in Coal Drill Bits

A special feature of Kennametal Drill Bits in larger sizes is a web core breaker. It is incorporated into the body design and extends from the center of the bit to the base of the cutting edge. Being offset it breaks up solids that may be formed between the prongs through both pressure and impact exerted on them by the core breaker while drilling.

•

Machine Bit for Severe Conditions

Recently-developed Kennametal UR Bits feature a thick narrow cutting edge to offer great resistance to impact, and meet more severe conditions. While originally designed for continuous mining machines, it has since been adapted with equal success for service in conventional chain machines. Tip thicknesses employed are 3/16", 1/4", and 5/16" depending on conditions. Kennametal Catalog Supplement B-73 gives full particulars.

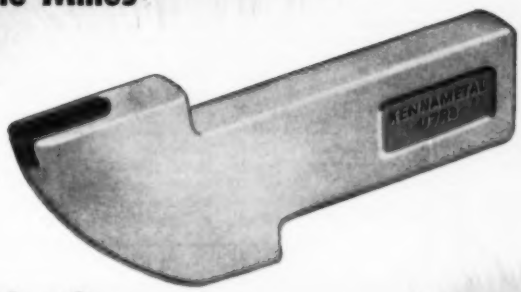
•

Hexagonal Shank Bits for Drilling Holes for 2-5/16" Diameter Tubes

Kennametal Hexagonal Shanks in sizes of 1 5/16" and 1 1/8" provide strong bit construction for drilling larger diameter blast holes. They also enable the bits to withstand heavier pressure when they are being used on large drills for drilling hard impurities.

(Advertisement)

Sloss-Sheffield Steel & Iron Co.
Bessie Mines



Produce
28,054 TONS
PER SET OF KENNAMETAL BITS

L. W. Byram, Mine Superintendent:
". . . Kennametal Bits cut 638 places without a bit being changed."

The above performance of Mining Machine Bits is the highest on record at the Bessie Mines of Sloss-Sheffield Steel & Iron Co., Birmingham, Alabama. Mine Superintendent L. W. Byram states, "Kennametal 'U' Bits, on a test, cut 638 places, or 28,054 tons of coal without a bit being changed." Before using Kennametal, bits were changed or spotted three to five times per shift, or the machine was stopped 100 to 200 times more often for bit maintenance. Performance like this explains why Kennametal Bits enable production increases to be made, while giving low actual bit cost and offering maximum ease of operation for both men and machines.

Special features of Kennametal that have enabled them to give the same superior performance in hundreds of other mines are superior bit design, highest quality tungsten-carbide, and on-the-job attention by competent Kennametal representatives. For the best in service, performance, efficiency, always specify Kennametal—the quality bit of the coal industry. Kennametal Inc., Latrobe, Pa.

KENNAMETAL ®

Quality Carbide Of The Coal Industry

World's Largest Manufacturer of Tungsten-Carbide Mining Tools

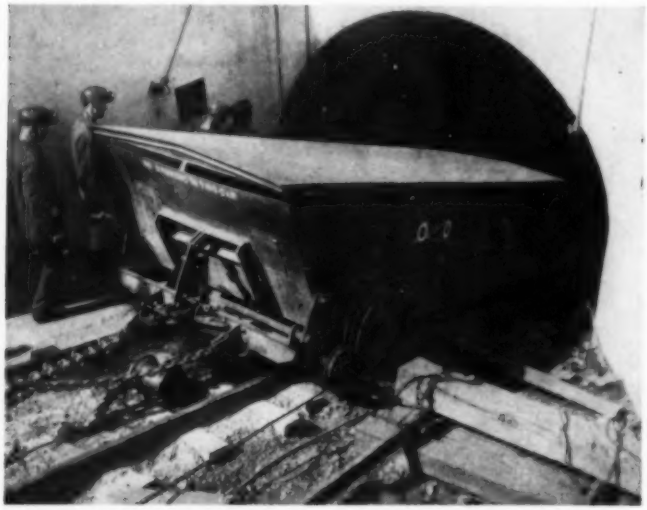
fuddle the operator?" Questioning the operators on this brought some surprising answers. Exactly one-half of the men told Mr. McCarty: "When I first started operating a car, the changing of feet to operate the controls confused me." Some reported that this confusion lasted for months. The other half said that changing controls made no difference to them, even when they were first learning.

3. "Perhaps some of these men still become confused in an emergency or during a thoughtless second?" That seemed possible since with even experienced operators it is still a fact that most accidents occur at starting and stopping points and right after changing seats to move in the other direction.

4. "Why are shuttle-car controls so arranged that one second the right foot operates the brake and the next second the left foot is used?" No one seemed to know the answer to this one, unless that was the way the first car was built—and there has been no change since.

As a result of this reasoning, C. F. Wilcox, chief electrician at the mine, was consulted and carried out the improvements after the decision to rearrange the controls on two cars was made. The possibility that changing the controls at this late date might cause accidents to experienced operators was recognized, and consequently only two cars were immediately revamped, both for use on the same section at Somnan mine, near Portage.

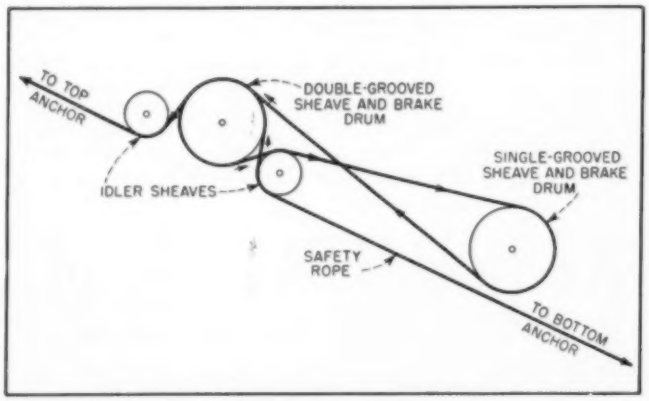
Mr. Wilcox considered going one step further and connecting the accelerators so that only one would be "live" at a time. Most miners tend to wear their lamp batteries on the left hip and experience has indicated that the battery case often bumps the accelerator as the operator changes seats. With both accelerators live, bumping them with the battery case has caused cars to move inadvertently. While changing the accelerators would have been easy enough, Mr. Wilcox gave up the idea because the change in the electrical system from the factory setup would have destroyed the permissibility.



A HEAVY SPRING at the lower end of the rod shown at the side of the car applies the brakes to hold the car on the safety rope if slack occurs in the main hoisting rope as a result of breakage or otherwise.

Safety Rope Prevents Slope Runaways

A SAFETY ROPE anchored alongside the track and threaded through sheaves on the man-trip cars provides positive protection against man-car runaways on the man-and-materials slope at Mulga mine of the Woodward Iron Co., Mulga, Ala. As shown in the accompanying illustrations, the rope is threaded through sheaves backed up by brake drums. In normal operation, the car moves up and down the slope with the drums turning freely while the safety rope is anchored at the top and bottom. If the main rope breaks, a heavy spring on the rod shown at the side of the car applies the brakes and the car is held in place by the safety rope. The device, patented by Woodward, works in either direction. As long as the main rope is intact, a toggle mechanism on the hitching compresses the spring and prevents brake action.



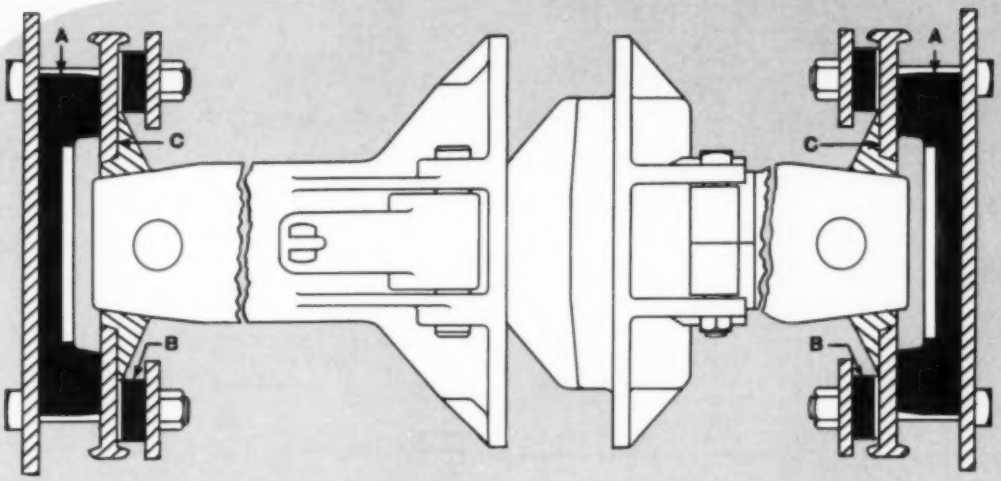
ANCHOR ROPE is threaded through the various sheaves and drums on the side of the car as shown.

You Don't Have To Be An Author . . .

NOT EVERY GOOD "Operating Idea" we receive from the field arrives as a typewritten manuscript accompanied by an engineering drawing. Some are written longhand in pencil on mine memo paper. As often as not, the sketches are freehand renderings that show the salient features and details that a master mechanic or mine boss would want to know. Make it easy on yourself. Send your idea to: The Editor, *Coal Age*, 330 W. 42 St., New York 36. We'll do the work of editing and drafting, and send you $10 or more on publication. Just be sure you tried the idea and found it practical.

HAULAGE WAYS *Jr.*

A - Rubber Buffing Pad
B - Rubber Pulling Pads
C - Clevis Casting



Your Cars Last Longer

WHEN COUPLERS TAKE THE BEATING!

Dead slack in a mine car coupling allows the cars to give one another the worst sort of punishment as they surge and jerk in a moving trip. Naturally, maintenance costs go up, and car life decreases when each trip means a beating for the car. These are the reasons why the coupler draft gear is of such importance.

Resilient rubber draft gear gives all-around support to the clevis casting in O-B Automatic Mine Car Couplers. This gear also prevents uncontrolled movement between the car and the coupler. Thus dead slack is eliminated without creating a rigid coupler mounting. Instead of beating the cars, haulage blows are spent in compressing these sturdy rubber blocks in the O-B draft gear. These are the reasons why you'll do well to consider O-B Automatic Mine Car Couplers when you replace couplers or get new cars.

Ohio Brass

MANSFIELD (B) OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

O-B Automatic Mine Car Couplers, with their durable rubber draft gear, absorb the jerks and bumps of coupling and haulage operation, and protect the car from these shocks.

Williams Mine Picked O-B Trolley Materials

Because:

O-B "CUSHIONED" SEMI-CATENARY TROLLEY IS BUMP-FREE AT ALL HAULAGE SPEEDS

High trip speeds without dewirement hazards depend on smooth, level trolley wire at Williams Mine. So does reliable operation of "Power On--Power Off" automatic track switching. Bumps in the current collector path can't be tolerated. That's why "Cushioned" trolley--or Dual Semi-Catenary Trolley--built with O-B Line Materials, is an important part of the Williams trolley haulage system.

Completely free of hard spots, this trolley wire is hung without rigid connections between wire and roof. Instead, clamps hold the wire to feeder cable. Both wire and cable are free to give a little bit as the collector passes. This spring-like quality of Dual Semi-Catenary Trolley provides the "Cushioned" path needed at Williams Mine for bump-free, high-speed current collection.

Where headroom is available, Dual Semi-Catenary Trolley provides a low-cost speedway for locomotive current collectors. Check the construction details shown--see if they don't fit in with your plans for future development work!

and O-B Shoes for Swift Haulage

Because:

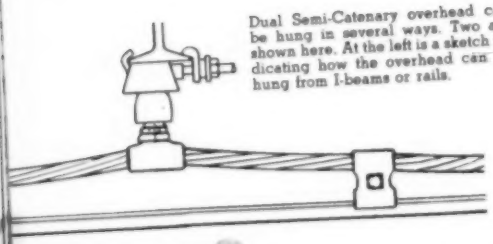
O-B SHOES HUG THE WIRE AT HIGH SPEEDS

At Williams Mine of the Consolidation Coal Co. (W. Va.), motormen depend on O-B Type-L Shoes to cling to the trolley wire at all speeds--through all trolley fittings. Although trips move as fast as 40 miles per hour, motormen never need to guide trolley poles by hand. They know their current collectors will ride through section insulators and switches without bumps or arcs, or through frogs--either turnout or straight through--without dewiring. With the danger of flying poles eliminated, they can take full advantage of the Williams Mine high-speed overhead and road bed.

Flanges on the O-B Type-L Shoes are long enough to guide the collector through frog pans; high enough to keep it on the wire. These wire-hugging shoes let Williams Mine motormen give full attention to the haulage way ahead. Let them give the same combination of speed and safety to your haulage system!

Made for Each Other

O-B SHOES AND O-B LINE MATERIALS WORK TOGETHER



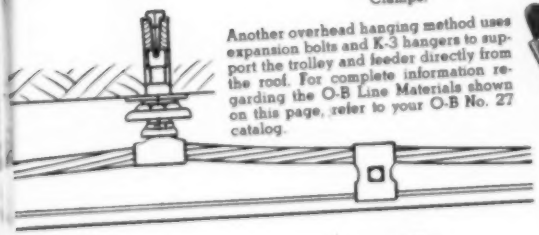
Dual Semi-Catenary overhead can be hung in several ways. Two are shown here. At the left is a sketch indicating how the overhead can be hung from I-beams or rails.

Insulated I-Beam Hangers are offered for various sizes of beams.

Dirigo Spool provides proper secondary insulation.

Trolley wire hangs from the cable with Combination Trolley-Feeder Clamps.

Bulldog Feeder Sling suspends feeder cable from hanger.



Another overhead hanging method uses expansion bolts and K-3 hangers to support the trolley and feeder directly from the roof. For complete information regarding the O-B Line Materials shown on this page, refer to your O-B No. 27 catalog.

K-3 Hanger.

A-3 Expansion Bolt.

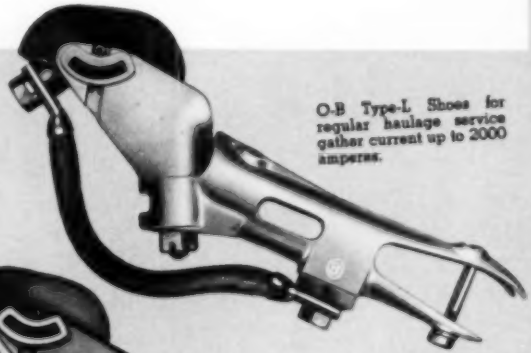
4302-M

HAULAGE WAYS *Jr.*

O-B Trolley Shoes cling to the trolley wire at all speeds. O-B Line Materials keep the trolley wire underrun smooth. Working together, they make the smoothest sort of current collection possible for every sort of mine overhead. One such overhead--Dual Semi-Catenary--is described on the preceding two pages. Shown here are the materials used to build this "Cushioned" overhead.

O-B Shoes give the best possible current collector performance. They cling to the wire at high speeds, reduce arcing, and complement O-B High Speed Trolley Wire Fittings in the job of making trolley wire last longer. Type-L Shoes--like the one shown on the preceding pages--are used for collecting currents of as much as 2000 amperes. Type-M Shoes have a longer contact area against the trolley wire, as well as a double shunt. These features reduce resistance and help to dissipate heat. Type-M Shoes are generally used for currents in excess of 2000 amperes.

Let O-B Line Materials and O-B Shoes team up in your haulage system for the smoothest current collection you've ever seen!



O-B Type-L Shoes for regular haulage service gather current up to 2000 amperes.

O-B Type-M Shoes have double shunt, and increased contact area to handle heavier haulage requirements.

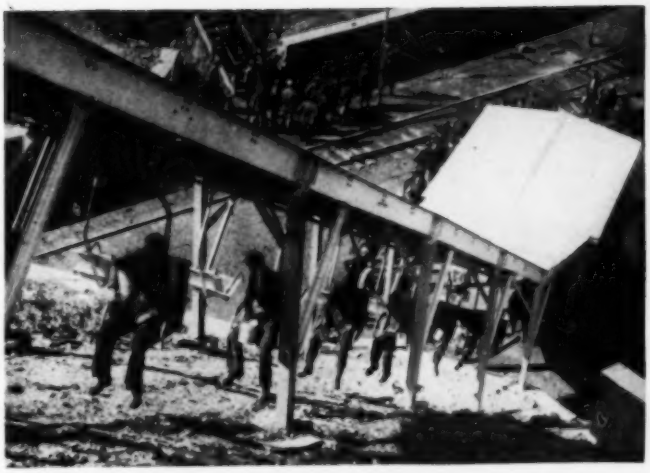
Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

Ski Hoists Hauls Miners Uphill In Style

MINERS at the new Gary No. 14 mine of the U. S. Steel Co., Gary, W. Va., ride in comfort up from the lower portal to the bathhouse on the mine's exit level above using this ski hoist installed by the company. The hoist, a chain-belt seating device similar to those often found at swank winter resorts, provides effortless transit both up and down the 70-ft cliff separating the two levels of the Pochahontas seam. It is reportedly the first application of the chair-hoist idea in coal mining. Several years ago Jones & Laughlin installed at its Vesta-Shannopin No. 5 mine an endless-cable "Skeetow" onto which the men held as they walked up the hill (*Coal Age*, January, 1947, p. 90).



HARDFACED TEETH as originally installed on bulldozer blade permitted faster loading and gave over five times the usual service.

AFTER TOUGH SERVICE, most of blade is left, can be easily retoothed.

Hardfaced Blade "Dentures" Give Five Times the Service

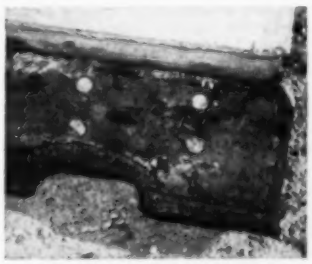
BETTER THAN FIVE TIMES the service life of ordinary replacements has been realized with the hardfaced scalloped grader blade developed in the San Bernardino County shop, San Bernardino, Calif., according to a recent issue of *Fusion Facts* published by the Stoody Co., Whittier, Calif. The fast-loading toothed grader blade developed by Ed Reese, blacksmith foreman, has proven so successful that the idea has been applied to practically all other earth-moving equipment used by the county.

Since the wear is taken primarily on the teeth, the body of the blade shows only a slight reduction in width by the time the teeth are worn off. As shown in the photo, practically all of the original blade is left. New teeth can easily be added, the part refaced and returned for an additional long service—while virtually eliminating new replacement cost.

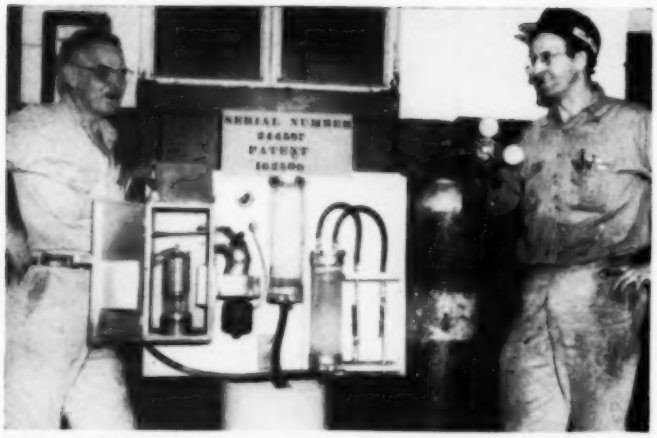
The bulldozer shown was operated in very tough digging over an 8-mo period, and for two-thirds of that time, or more than 5 mo, the blade was in continuous service.

An important advantage of the toothed blade, of course, is faster loading in a shorter run with less horsepower. In addition, track life is increased since blade design permits some of the fine material to remain in the cut to provide a smoother cushion on which the crawler pads ride.

Shop procedure for preparing the scalloped blades is very simple. Carbon-steel teeth from 6 to 10 in long and 2 to 3 in wide are welded onto an ordinary blade. Stoody "Self-Hardening" then is electrically applied to the tooth ends, sides and throats on the blade face. Generally, the alloy deposit is about 1 in wide. The revamped and hard-faced blades then are finished by heat treatment to the desired toughness. The hard metal deposited on the wearing edges is not affected by the treatment.



CLOSE UP of hardfacing deposit on skip-loader blade.



LEE B. McCORMICK (left), lamphouse foreman, Helen mine, EGFA, developed and patented this safety-lamp tester, with experimental assists from Charles Karbonit (right), lamphouse attendant.

Lamphouse Foreman Patents Safe, Convenient Safety-Lamp Tester

STRICT ATTENTION to the single problem of devising safe, quick, convenient methods and equipment for testing flame safety lamps has resulted in the granting of a U. S. patent to Lee B. McCormick, lamphouse foreman, Helen mines, Eastern Gas & Fuel Associates, Helen, W. Va., for his development of the "Lee-Mac" safety-lamp tester.

Fully realizing that expedient methods, such as filling a test chamber with fumes from a gasoline- or naphtha-soaked rag, were inadequate and unsafe, Mr. McCormick in 1943 began his investigations, which eventually led to patent approval for his tester in August, 1951.

The Lee-Mac unit consists of a testing chamber and gas-feeding apparatus which introduces a measured volume of explosive gas (propane) into the test chamber. The unit is designed for use in lamphouses where safety lamps are serviced and reassembled for underground use. It provides the lamphouse attendant with a positive means for determining that lamps are properly assembled and that their parts are in safe operating condition.

To operate the tester, the lamp is inserted in the testing chamber with its igniter projecting through the bottom of the chamber. The door of the chamber is closed and fastened, and relief for the explosion, if any, is provided through a hinged cover on top of the chamber.

Propane is fed from the high-pressure cylinder, through a valve, and into the right-hand waterfilled measuring cylinder. This forces the water from the first measuring cylinder into the higher cylinder, shown in the photo. When the second valve from the right is opened, the weight of the column of water in the high measuring cylinder forces the gas into the testing chamber where it is mixed with air by an electric fan. Thus, an explosive mixture surrounds the lamp, inside and out.

The attendant strikes the igniter of the lamp. If the lamp is in safe condition, any explosion will be confined to the interior of the lamp. If the lamp is defective, however, the gas outside the lamp also will explode and the hinged cover will be blown open. An external igniter is mounted through the wall of the test chamber to prove the presence of an explosive mixture, if such proof is desired.

In turning the lamp igniter, the attendant's hand is protected by a double bottom in the chamber. The lamp rests on a true bottom and a higher false bottom fits snugly around the lamp fount. The igniter protrudes through the true bottom.

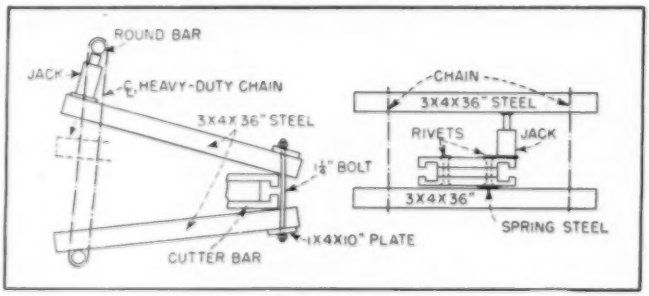
The measuring cylinder takes the guesswork out of lamp-testing because the volume of the measuring cylinder and that of the test chamber are in a ratio that insures a gas-air mixture within the explosive range of the gas being used, in this instance propane.

How to Repair a Sprung Cutter Bar

HAVE YOU EVER had a damaged cutter bar to work on? They can be mighty hard to handle. Clark Gilbert, who operates a mine service shop in Bridgeport, Ohio, recently received for repairs a cutter bar on which the rivets had been stretched and the chain guides spread apart as a result of the chain leaping out of the guides. In a letter to *Coal Age*, Mr. Gilbert tells of the tools and methods he used to repair the damage and put the machine back in service.

The tools were an 80-ton jack, two 3 x 4 x 36-in tool-steel bars, two 1 x 4 x 10-in steel plates drilled on 5¾-in centers for 1¼-in bolts, two short round bars and some heavy-duty chain.

As shown in the diagram, the tools were arranged to provide a giant "nutcracker" to be used in squeezing the cutter bar back into shape. The 1 x 4 x 10-in plates, held together by the 1¼-in bolts, formed the fulcrum of the nutcracker. The 3 x 4 x 36-in bars were the handles. The force was applied by the jack, working against a yoke formed by the round bars and heavy-duty chain. The assembly was moved around the bar in 4-in steps to return the guides to their original configuration.



In refastening the rivets, a small piece of spring steel served as an anvil under each rivet in turn. The jack held the bar and rivet in place, as shown, while the rivet was reclosed.

Mr. Gilbert reports the cutter bar went back into service "as good as new" and the work was done simply, safely and accurately.

9 reasons why reliable REDSHOT* is the choice of the blasting crew

Made to the specifications of the explosives engineer... that's Hazard Redshot. Precision manufactured for mining operations, only Redshot can offer you these 9 important advantages:

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- Bright red for added visibility
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- Highly flame-resistant in accordance with requirements of U.S. Bureau of Mines and Pennsylvania Dept. of Mines
- Parallel conductors to reduce conductor resistance and prevent kinking
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*Patent Applied For

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Aid or Trade?
A CRISIS AHEAD

A crisis in the foreign trade relations of the United States is in the offing. It is a crisis caused by:

1. Efforts of producers in friendly nations to earn more dollars by increasing exports to the United States, and
2. Efforts of industries in the United States which would be hurt by competition from these imports to keep them out.

This crisis is a threat to the effectiveness of American leadership in the crucial effort to build the nations of the free world into a strong and unified group. It is the purpose of this editorial to advocate a constructive approach to the difficult situation that is developing.

Background of the Crisis

Most countries in the free world—with American aid—have managed to push their outputs well above prewar levels. As they have done so, they have been urged by our highest government officials to increase their exports to us. Sales in our market enable these countries to earn dollars which they use in turn to buy the products of America's farms and factories. Thus, as they become self-supporting, the need of American aid is reduced.

But as these efforts to export more to the United States have promised increasing success, competitive American producers have become increasingly alarmed about what that success might do to them. Consequently, they are seeking more protection—by appeals to the U. S. Tariff Commission to recommend higher import duties and by appeals to Congress for new laws to discourage imports.

Our Friends Protest

A year ago Congress answered one of these appeals by imposing a quota on imports of dairy products. Now, among many other legislative proposals being strenuously pressed is a move to extend the scope of "Buy American" legislation. A year ago the U. S. Tariff Commission had only four petitions for increased import duties on its docket. Since then fourteen more petitions have been filed and others are definitely on the way.

Faced by these mounting efforts to block the sale of their products in the American market, no less than eleven friendly nations, including Great Britain, France, Italy, Canada, the Netherlands, Switzerland and Denmark, have filed protests with our State Department. Through many of the protests runs one refrain. Although stated in diplomatic language, it might be correctly paraphrased to say: *"In*

sending us aid you have made it very clear that you want us to get on a self-supporting basis at the earliest possible moment. But, when we begin to make headway in that direction by trying to sell you more of the things we are equipped to produce, you start closing your market to us." The threat of European resentment against the United States being stirred up by this argument is obviously great.

At the same time there exist grounds for special resentment in the United States against certain prospective imports of European manufactured goods—those of machine tools, for example. In part these will be produced with machinery that has been sent to Europe as part of our economic aid program. With absolutely no diplomatic language involved, the argument, which will be extended much farther than the facts would justify, will run: "*We gave those people the equipment that they now use to cut our throats!*" This line of argument will find response among workers as well as employers in industries faced by more competition from imports. Labor, too, is keen for protection against more foreign competition.

Aid or Trade?

As between continuing direct economic aid to Europe or accepting the imports that would make those countries self-supporting, some would prefer to continue the aid program. They argue that the tax machinery of the federal government can spread the burden of aid broadly, while we have no comparable machinery that can cushion the shock to individual industries, firms and communities that may result from stepped-up imports of competitive products.

As we see it, this position is untenable. It would make rubbish of our Atlantic Charter promise ". . . to further the enjoyment by all States, great or small, victor or vanquished, of access, on equal terms, to the trade and to the raw materials of the world which are needed for their economic prosperity." It would be an admission that, for all our profession of faith in competition and our opposition to European cartels, we really don't believe in competition.

U. S. Self-Interest

The people of this country have invested billions of dollars and seven years of hard work in the attempt to put our allies on a self-supporting basis. If we keep their goods out by raising trade barriers, we are directly defeating our own purposes.

Also, in moving to protect some groups of American producers we should be hurting others. For many American producers the export market, which this year will take about $14 billion of civilian goods, spells the difference between operating at capacity and closing down 25% of their facilities. When we discourage imports we cut off dollar earnings by other nations which are spent here to keep some of our factories and farms going.

At the same time, it must be recognized that certain American industries and their capacity to maintain employment will be hurt by increased imports. Hence it becomes critically important for the United States to formulate a national program designed to help these industries and communities take up the shock.

There is no neat and simple prescription by which this can be done, but several possibilities have been suggested. One on which there is general agreement is that tariff reductions should be gradual. To cushion their impact, the government might well give preference on defense orders to industries and areas adversely affected by an increased volume of imports. Direct assistance to workers and companies in shifting to different lines of business may be worth consideration.

These are by no means all the possibilities. They may not even be the best. But they do serve to suggest the necessity for flexibility and imagination in dealing with the growing crisis in trade relations. *Our ingenuity in developing new ideas to meet this crisis may well be a decisive factor in our effort to weld the free nations into a strong and durable alliance.*

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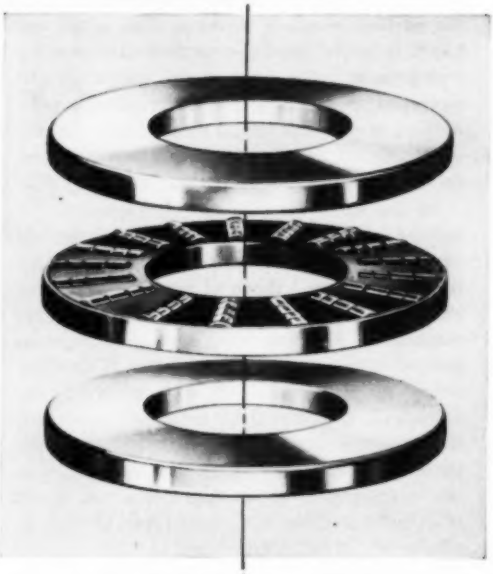
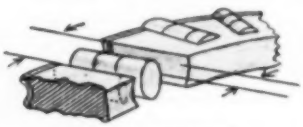
True *Line* Contact

reduces unit pressures; increases maximum capacity

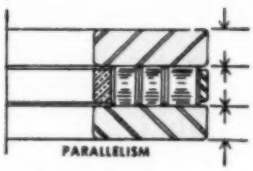
Heat-treated to insure uniform hardness and surface structure, both the solid-cylindrical rollers and the thrust plates of Rollway Thrust Bearings are held to extremely close limits of parallelism. The result is a true line contact that reduces unit pressures, increases maximum capacity and affords a wide margin of safety for overloading shock or vibration.





PARALLELISM

Accurate parallelism between the rollers and the matched thrust plates is repeated in the parallelism between the separator slots and the rollers themselves—all adding up to quietness, equalized wear and longer life.



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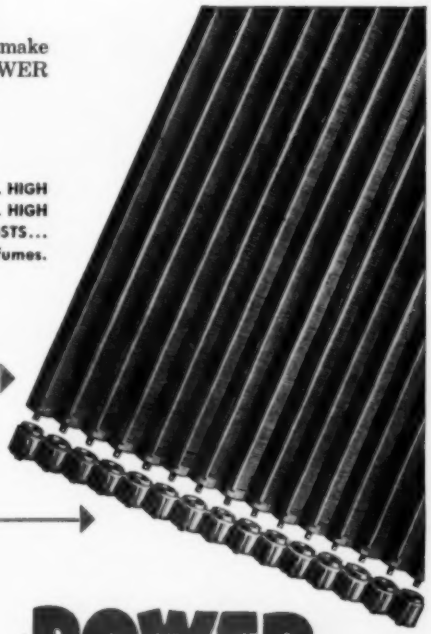
RAPID, HIGH PRODUCTION HAULAGE, more trips per shift . . . HIGH MAINTAINED VOLTAGE, with uniform speed to end of shift . . . HIGH AVAILABILITY . . . LOW OPERATING COSTS . . . LOW MAINTENANCE COSTS . . . LOW DEPRECIATION COSTS . . . SAFETY from hazards of fire and fumes.

BECAUSE OF . . .

IMPROVED POSITIVE PLATE CONSTRUCTION. The long-life grids now contain SILVIUM—an alloy of silver, lead and other components—which make them highly corrosion resistant.

. . . the New Polyethylene insulating tube sealer of acid-proof, non-corroding plastic. It fits snugly into slotted tubes of positive plate, and reduces loss of active material. Even the small sediment deposit of the past is reduced 50%. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.



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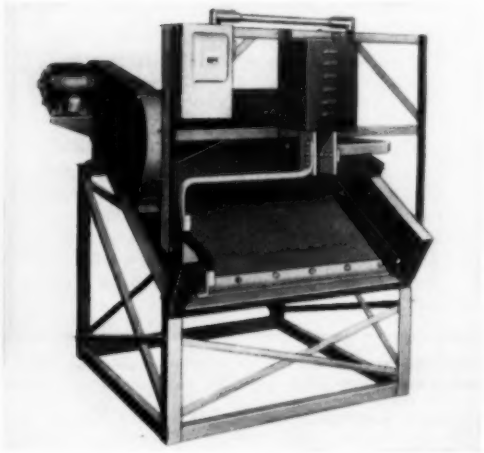
Equipment News

"Roll-Over" Bodies Dump To Either Side (1)

New dump truck bodies, entirely mechanical in operation, can be mounted on standard trailers for applications where side dumping both ways is desirable. Heavy-duty dump bodies, made of 10-gage steel, ride a self-contained subframe which consists of three heavy box-type outriggers. Used in trains, Roll-Over bodies can handle more than 50 cu yd of material with only one haulage tractor, the maker says. In dumping, the operator unlocks a spring lock and releases a lock lever on the side opposite to dumping. The dump is returned manually or tilted back. —*Galion Allsteel Body Co., Galion, Ohio.*

Hydraulic Drill Combines Safety With Speed (2)

No spark, no shock, no kick are features of new Schroeder Model 12-B hydraulic coal drill, which is operated from the hydraulic system of cutting machine, timbering machine or roof-drilling machine, thus removing one electric motor from the face area. Operating from equipment with lower-volume pumps, drill speed is lower but the application still is frequently practical. According to the makers, the lightweight, low-cost drill has made a 9-ft x 2-in hole in the Pittsburgh seam in 23 sec, an 8-ft x 1¾-in hole in the Island Creek seam in 36 sec, and an 8-ft x 3-in hole in the Freeport seam in 12 sec. Full details from *Schroeder Brothers, 3116 Penn Ave., Pittsburgh 1.*



Heated Cloth Screens Wet Fines Faster (3)

New Leahy screen with built-in FlexElex heating equipment for the screen surface provides better screening with practically no blinding with minimum power input for heating because of the reduced circulating load that results from better initial screening. Available as a screen-and-heater package or as a conversion kit for a Leahy screen already in the field, the new unit operates at only 9 or 10 kva under normal conditions and is easily regulated for varying conditions. Because heated cloth needs no brushing or beating to remove built-up fines, screens last longer, the maker states.—*Deister Concentrator Co., Fort Wayne, Ind.*

Multi-Speed Transmission for High-Power Jobs (4)

Turner transmissions, Models 2004, 3004 and 5004, are offered in ratings up to 60 hp for applications where it is necessary to vary the turning speed of electrically-driven machines, and for applications where it is desired to operate an internal-combustion driving engine at constant speed while varying the speed of the driven machine. While all units are

Mine Official Reports 37.5% Lower Bit Cost

Official in an Armstrong Co., Pa. mine report that Kennametal Mining Machine Bits result in 37.5% more cutting per bit life as compared to other carbide bits that have been used. Total tonnage: with other carbide—3,126 tons, with Kennametal—4,994 tons. Service between bit changes was increased from 9 places to 14 places. Bit life was 37.5% longer.

●

Matthews, Moore Coal Co., Gets Answer to Power Problem

Results of power test made for Mr. Claude Matthews, Supt., Moore Coal Co., Devonia, Tenn., show that Kennametal U-5-H Bits require 29% less power than steel bits. Test was made by a West Virginia consulting company. Particulars are: The machine using steel bits averaged a load of 52 H.P. on the motor while Kennametal averaged 37 H.P. or 29% lower average power. The machine which was rated at 50 H.P. operated at a 2 H.P. overload when steel bits were in service.

●

Bit Cost Reduced to .58 cents per ton, Clymer No. 2 Mine, Clearfield Bituminous Coal Corp.

J. F. Simpson, Mine Superintendent, says, "We have used Kennametal Bits for three years and they have cut 284 places per set." Prior to the use of U-7 Bits at the mine, complete bit changes or resettings were made on each place that was cut. Bit cost averages only .58 of one cent per ton.

●

Booklet on Mining Bits Available for the Asking

New styles, sizes, prices and performance data on Kennametal Bits are available in new Mining Catalog M-6 published by Kennametal. You can have a copy by writing us and asking for it.

(Advertisement)

Duquesne Light Co.'s Harwick Mine

Reduces Cutting Cost

with Kennametal Bits

James H. Truax, mine superintendent, says, "We checked the performance of 100 Kennametal U-4 Bits and found that they gave a bit cost of $.0026 per ton, which we consider very good." The cutting was done in a section of the mine where the coal was only medium hard to cut, and in other sections where it was more difficult, the U-7 was put on test. The record there, according to James Truax, was also satisfactory. He says, "The U-7 Bits have helped to make a difficult cutting job easier and more profitable." In this cutting, 14 places were cut between bit changes and 50 places were cut per set of bits.

Beside lowering bit cost, other advantages that are obtained by using Kennametal Bits are more efficient cutting because fewer stops are made to change or set bits, a large saving is also made on machine repair because the bits stay sharp and allow it to cut freer, and due to less changing and fewer dull bits, the cost of bit reconditioning is greatly reduced.

One of our service representatives who deals only in cutting and drilling problems will be glad to explain how Kennametal Bits can be cost-savers for you. Kennametal Inc., Latrobe, Pa.

The name of your nearest Kennametal representative can be found in your McGraw-Hill Mining Catalog. Contact him today.

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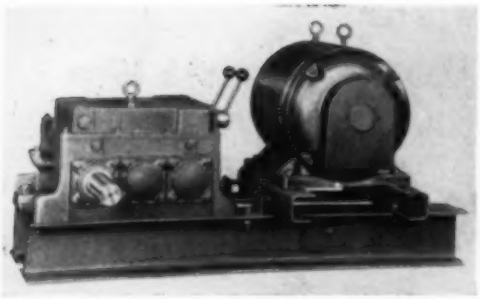
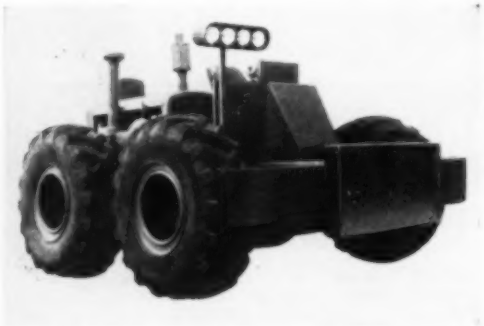


available in four speeds with a selection of different speed ratios, some models can be supplied with six and nine different speeds. Two types of mounting bracket are offered to provide for different conditions of use, and the output shaft can be left, right, forward or rear. Literature available from *Turner Machinery Co., Kansas City 8, Mo.*

of operating requirements. Major advantages are simplicity, low-cost operation and maintenance, and greater reliability, the maker says. Two-stage, oil-cooled, rotary sliding-vane compressor design eliminates many compressor problems, such as leaky valves, piston troubles and clutch wear. In the Gyra-Flo, there are no valves, pistons, rings, rods or clutch. The continuous rotary action provides a steady flow of air without pulsation or vibration, and capacity control is a stepless system that controls output smoothly from 0 to 100% of rated output at pressure that stays between 100 and 110 psi. The 600 is diesel-driven, the 105 is gasoline-powered and the other two may be had with either type drive. More details from *Ingersoll-Rand Co., 11 Broadway, New York 4.*

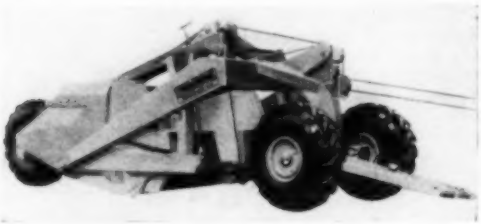


New Unit Designed for Push Loading (5)

For earth-moving duties where dozers are used exclusively for pushing, the Tournatractor is a Super C Tournadozer with the blade, power-control unit, A-frame and controls omitted. In their place is a 3 x 15-in billet which spans the machine and carries a heavy-duty push plate. The machine is available with torque converter and is adaptable to pulling operations. Dozer parts can be added for reconversion. With various tire sizes available, the manufacturer recommends 21:00 x 25 or 18:00 x 25 for operations in mud, clay or rock, and wide-base tires for operations in sand.—*R. G. LeTourneau, Inc., Peoria, Ill.*

Rotary Compressors Feature Low-Cost Operation (6)

Three new rotary compressors, 315, 210 and 105 cfm, in addition to the existing 600-cfm model, have been added to the Gyra-Flo line of portable compressors to cover a wide range

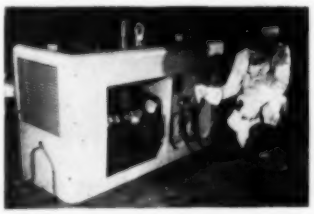


Maneuverable Scraper Holds 22 Cu Yd (7)

For use with the largest tractors, the TC-190, a new scraper with a capacity of 22 cu yd, heaped, or 19 cu yd struck, has manganese-alloy side cutters to protect side sheets of the bowl, features rapid loading from latest application of the "boiling bowl" principle, dumps faster with less tractive effort because of a rolling motion imparted by the ejector, which is pivoted at the base. Also, cable reeving is simpler, thus adding to cable life, and maneuverability is increased by low center of gravity and high yoke and ground clearance, the maker claims. Bulletin TC-250 or other information available from *Wooldridge Mfg. Co., Sunnyvale, Calif.* or *5345 N. Winthrop Ave., Chicago 40, Ill.*

Welder Supplies Auxiliary Power (8)

Type EW-20, a new lightweight engine-driven welder, also supplies auxiliary AC power at 110 v, 60 cycles, single phase, from a conventional plug-in outlet. The self-excited compound-wound generator also functions as a single-phase alternator. Welder rating is 200 amp, 40 v, 60% duty cycle with current range from 40 to 250 amp in accordance with NEMA standards. During off-welding periods, auxiliary power for tools and



lighting is 3 kw at 100% power factor or 2 kva at 80% power-factor. About 300 w is available during welder operation. The drive unit is a Ford 120 engine. Two-wheel running gear is provided for road towing. Details from *Westinghouse Electric Corp., Pittsburgh 30, Pa.*

New Trolleyphone Easier to Service (9)

The new Femco trolleyphone, 2550 series, has been made more compact and vastly easier to install and service than previous models of similar equipment,

Specify FIRTHITE "Famous Blue Bits" with assurance that you will get consistently high production. Developed in the world's most modern carbide research laboratory, and manufactured under rigid quality control, FIRTHITE Mining Tools have been used successfully for many years over a wide range of operations. On job after job they have increased tonnage and reduced costs by eliminating roof drilling "bottlenecks," minimizing the "downtime" of mining machines, and providing maximum performance.

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EASIEST WAY TO MAKE ENDS MEET

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the manufacturer reports. Plug-in components are used to replace worn parts, thus cutting down-time to a minimum. Microphones and speakers also plug in, so that parts may be returned to the maker for service. Bulletin available from *Farmers Engineering & Mfg. Co., Pittsburgh 21.*

New Bushing for Variable-Pitch Sheave (10)

New Magic-Grip bushing makes possible quick and easy installation and removal of Vari-Pitch sheaves, and permits mounting the sheave on the shaft so that adjustment may be made from either end. The bushing, consisting of a tapered sleeve, collar and snap ring, slides into the tapered bore of the sheave. Tightening of hollow-head capscrews draws the bushing deeper into the tapered bore, depressing the split sleeve and locking the entire assembly to the shaft. The sheave is keyed to the bushing. Full details from *Allis-Chalmers Mfg. Co., Milwaukee, Wis.*

Power Pumps Dispense Materials (11)

A complete line of air-motor-operated pumps and accessories for automatic application of heavy or light materials, such as, sealers, adhesives, roofing, water-

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Because there is more built into them!

FIRESTONE off-the-highway tires give you more for your money because they are engineered and built with the extra advantages that reduce downtime to a minimum.

New TENSION DRIED, SUPER GUM-DIPPED cord construction gives extra long body life, because you get more retread service and fewer downtime losses. There's no tire growth. Clearance and mating problems are simplified. There's no tread cracking. Cuts don't "grow." There's a 60% stronger bond between cords and body rubber to give you the strongest body ever built.

Firestone off-the-highway treads last longer because they're built double thick with *extra* tough, cut-resisting tread stock. Four *extra* tread plies absorb shocks and give maximum protection against impact breaks. The sidewalls are *extra* thick and snag-resistant.

AMERICA'S FUTURE PROGRESS DEPENDS ON BETTER AND SAFER HIGHWAYS

Let your Firestone Dealer show you how the many extra body and tread advantages of Firestone Tires give you more for your money.

WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES, SPECIFY FIRESTONE

Copyright, 1952, The Firestone Tire & Rubber Co.

screen moist slack and powdered coal

WITHOUT BLINDING

For a few cents an hour, the Hanco Electric Screen Heater heats woven wire screens to prevent blinding and speed screening of moist slack, powdered or "soft bottom" coal.

- Faster screening and elimination of cleaning labor saves many times the current cost.
- Elimination of cleaning and extra weight of clogged screens multiplies screen life.
- Quick-Change Attachment makes screen changes easy.
- Distribution bars make direct contact with screen for most efficient current travel.
- Distribution bars and insulation shielded from abrasion.

Write for Bulletin 521

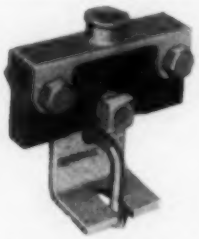
F. R. HANNON & SONS

Engineers
• *Since 1926* •
Manufacturers

CANTON 7, OHIO

Hanco
THE PIONEER
ELECTRIC SCREEN HEATER

proofing, insulating and caulking compounds is offered in 11 standard models for spray-gun, pole-gun or flo-gun application. Units are available for use with original 400-lb and 100-lb drums, and with container for 5-gal material package. Catalog 40 available.—*Lincoln Engineering Co., St. Louis 20, Mo.*



Feeder Clamp Simplifies Wire-Hanging (12)

The patented Dukane feeder-wire hanger clamp consists of one major part instead of two, providing a hanger of high mechanical and dielectric strength. Suspended from an expansion bolt, and with bottom and top sections insulated from each other by a bakelite insert, the new hanger can be used with any size feeder from 4/0 to 1,000 M.C.M.—*Duquesne Mine Supply Co., Pittsburgh 9.*

New Double-Blade Section Switch (13)

Completely new smooth-underrun section switch (patent applied for) is suspended from a piece of laminated bakelite and features a reversible double-blade switch. The switch supports are mounted directly on the wire clamps and the unit is of exceptionally large capacity, the maker says. Full construction and operating details available from *Duquesne Mine Supply Co., Pittsburgh 30.*

Equipment Shorts You'll Want to Check

(14) HAND TACHOMETERS, designed to cover a wide range of applications with infrequent or no shifting, have a guaranteed accuracy within 0.5%, and, because of the application of a centrifugal governor, the units are not affected by changes in temperature, moisture, electricity or magnetism. A vane-damping mechanism eliminates vibration of the indicating hand without introducing lag. Universal tachometer is available for ranges of 25,000 to 30,000 rpm and 30,000 to 40,000 rpm. Single-range hand tachometers serve 300-4,000 and 150-2,000 rpm ranges.—*O. Zernickow Co., 15 Park Row, New York. 7.*

(15) ANTI-STATIC EXTINGUISHER—Plastic horns of hand-held, carbon-dioxide fire extinguishers, which can build up an appreciable static charge from the friction of the flowing gas, now are grounded by a pair of copper strips in the new Alfco anti-static horn recently announced by *American-LaFrance Corp., Elmira, N. Y.*

(16) LABORATORY FURNACES, using a tap-changing transformer for 36 steps of temperature control, provide temperatures up to 1,950 deg F. The transformer is mounted in the base of the unit, thus eliminating accessory rheostats and input control devices. Bulletin LAB-552 available from *Hevi Duty Electric Co., Milwaukee 1, Wis.*

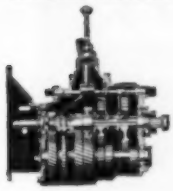
(17) AIR-OPERATED SAW cuts timber-sawing time to only one-tenth of that required for hand sawing, the makers claim. The 14-lb unit, equipped with straight reciprocating blade, operates from any 60-cu ft or larger compressor. Blades are easy to sharpen, set and change, and since blade is away from

operator, no guards are required, thus permitting unobstructed view of cutline. —*Wright Power Saw & Tool Corp., Stratford, Conn.,*

(18) SILICONE INSULATION for Class H service holds its bonding strength and hardness at temperatures from 50 to 99 C above any known commercially-available resin. Known as SR-98, the new resin, which is used for impregnating glass cloth, asbestos paper or cloth and mica products, produces a rigid product that resists flow of high temperatures and has excellent abrasion and solvent resistance.—*General Electric Co., Pittsfield, Mass.*

(19) BLIND LOCKBOLTS — heat-treated, alloy-steel blind fasteners designed for use in tank repairs and other

Model 5-A-620 — one of 108 available standard Fuller Heavy-Duty Transmissions and Auxiliaries.



with enough gears, you can move the world

Iron ore from the Mesabi range . . . copper from the mines of Arizona . . . salt from the flats of Utah . . . coal from the pits of Pennsylvania . . . fruit and vegetables from California and Florida . . . big logs from the nation's forests . . . freight from coast to coast . . . the world's greatest transportation system constantly passes before our eyes . . . the world's most efficient trucks move over the marvels of economic history . . . the highways of America.

Leading designers, manufacturers, and operators of heavy duty trucks have worked closely with the Fuller Manufacturing Company from the very beginning of this transportation miracle—helping perfect and refine more efficient, longer lived and heavy capacity transmissions to assure every truck operator exactly the right gear ratios for his particular road and load conditions.

"*Fuller Firsts*" reflect this front-running teamwork . . . Fuller *first* to perfect a trouble-free transmission for high speed diesels; first to offer a line of auxiliaries so complete that *any* requirement could be met; first to harness up to 400 hp. in a single unit transmission; first with the revolutionary ROAD RANGER® with all ten speeds shifted by *one* lever—and no gear splitting.

Get the right gear to move *your* part of the world; the Fuller line is described in the *New* Condensed Specification Folder. Ask for it.

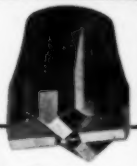
Fuller TRANSMISSIONS®

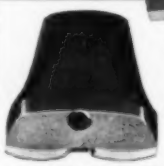
FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

BRUNNER & LAY
tungsten carbide
ROK-BITS®

greater footage





faster drilling
longer life

• Use Brunner & Lay Rok-Bits to give you the most for your money from man and machine. Brunner & Lay Rok-Bits give full support of the carbide to absorb impact on every stroke. Channel design affords maximum clearance. To save money and time, ask your dealer for Brunner & Lay Rok-Bits . . . or write to us.

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MOIL POINTS • CLAY SPADES

affiliated plants and warehouses
2425 East 37th Street
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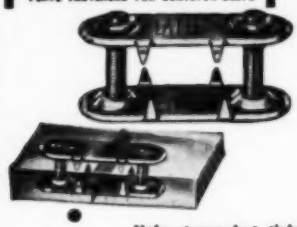
the reliable, leading source of supply since 1882

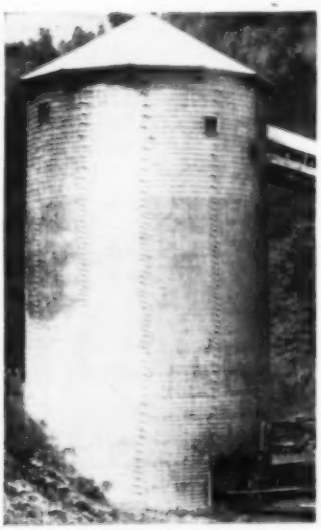
PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of [illegible] thickness. Write [illegible] Sheet.

ARMSTRONG BRAY & CO.
5340 Northwest Highway, CHICAGO 30, U. S. A.

450-ton Neff & Fry Silo
at Crichton No. 4



This 30 x 55 ft. Neff and Fry Silo was erected in 1949 at the Johnstown Coal & Coke Co.'s Crichton No. 4 Mine, Nicholas County, W. Va. A belt conveyor carries coal into the silo. When cars are spotted, coal is carried to them from the bottom of the silo by means of a vibrating feeder.

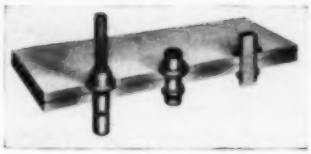
No two coal mine installations of our silos are alike in respect to loading and discharging. When conveying systems are involved, we collaborate with the mechanical engineers.

But all Neff & Fry Silos are alike in construction. The characteristic feature is the Super Concrete Stave, formed under hydraulic pressure; rocklike in density, strength, and endurance.

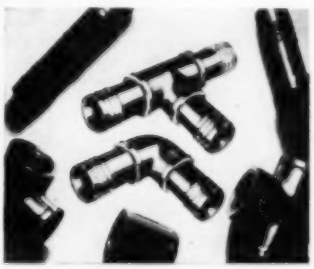
The facts are briefly told in our interesting folder, "Bin With the Strength of Pillars." A copy is yours for the asking.

THE NEFF & FRY CO. • 228 Elm St., Camden, Ohio

SUPER-CONCRETE STAVE STORAGE BINS



applications where work must be done from one side—are available in ¼- and ⅝-in diameters with allowable strengths of 4,990 and 8,190 lb, respectively, in single shear and 1,760 and 3,275 lb, respectively, in tension. Literature available from *Huck Mfg. Co., 2480 Bellevue, Detroit 7, Mich.*



20) **FLEXIBLE - PIPE FITTINGS,** quickly joined by the same methods previously used for insert couplings, facilitate making sharp turns or take-offs from plastic pipelines. The new ell and

USE THIS CARD

... TO GET MORE INFORMATION on products and bulletins mentioned in this Equipment News Section or for data on any product advertised in this issue. Circle item numbers, fill out and mail. No postage is needed.

YES—I would like more information . . .

Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (August 1952)

1	5	9	13	17	21	25	29	33	37
2	6	10	14	18	22	26	30	34	38
3	7	11	15	19	23	27	31	35	39
4	8	12	16	20	24	28	32	36	40

In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

.....

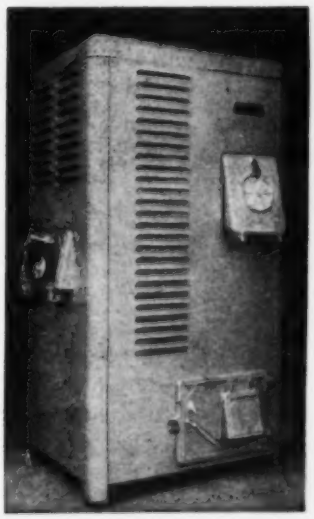
Name (Print) ..... **Position** .....

Company .....

Address .....

NOT GOOD if mailed after October 1, 1952

tee couplings are molded from single pieces of thermoplastic material guaranteed against rot, rust and electrolytic corrosion. In using the fittings, the pipe is cut with a hand saw at the desired point, the fitting is inserted and the pipe is drawn down over the serrated end of the fitting by a stainless steel clamp. A saw and a screwdriver are the only tools required and a connection can be completed in less than 2 min.—*Carlon Products Corp., 10225 Meech Ave., Cleveland 5, Ohio.*



(21) MIDGET SPACE HEATER, 25 x 30 x 56 in, provides smokeless combustion of coal or lignite, by means of a two-compartment chamber where volatiles are first driven off then consumed in the firebox. Advantages of the new unit, the Worsham Heater, are cleanliness, higher recovery of available heat units in the fuel, and hand-firing possibilities during power failures.—*Rhoades Industries, Inc., Fargo, N. D.*

(22) STEEL SHELVING, reinforced to hold 2,000 lb on each shelf, requires no nuts, bolts or tools in assembly or readjustment. A stud-and-slot arrangement permits shelf spacing on 1½-in centers;

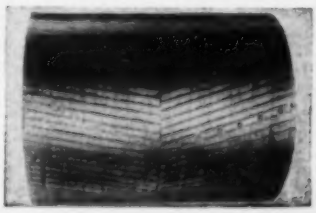
and dividers, drawers and back and side panels are available in all sizes.—*Equipto Div., Aurora Equipment Co., Aurora, Ill.*

(23) NEW HOSE NIPPLE, Le-Hi Series 650 Type SC, is made of one-piece steel tubing in all popular sizes to permit connection of straight-end hose to pipeline. Also available in brass or malleable iron, the nipple provides non-porous, scale-free connections suitable for a wide variety of industrial rubber-hose applications.—*Hose Accessories Co., 2700 N. 17th St., Philadelphia 32.*

(24) BRAKE LINER, featuring uniform internal structure, uniform coefficient of friction and uniform rate of wear, does not absorb water, dries quickly on the surface from frictional heat and does not grab or fade, the manufacturer says. The patented lining is made of asbestos webbing and a frictional binder compressed under 300 tons pressure to a density of 120 lb per cu ft, and has a tensile strength nearly 10 times that of woven brake lining.—*Russell Mfg. Co., Middletown, Conn.*

CARD USERS NOTE—Please be sure to give your name, position and company to insure proper handling of your request. Since some cards have been received without names, we would be glad to have you check us if you have no response to your request within a reasonable time.

(25) CONVEYOR PULLEY — New heavy-duty pulleys for large conveyor installations are equipped with Wedg-Tite hubs of split-tapered construction for speed in installation and removal of the pulley. The new pulley is totally enclosed for dirt- and splashproofing, and is available in sizes up to 6-ft diameter and 63-in face for shafts up to 10 in. More information available from *American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29.*



(26) PULLEY LAGGING, known as

FIRST CLASS
PERMIT NO. 64
(Sec. 34.9, P.L.&R.)
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

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McGRAW-HILL PUBLISHING CO., INC.
THE EDITOR, COAL AGE
330 WEST 42nd STREET
NEW YORK 36, N. Y.

Griplex Spiralagging, is of extra-strong duck with extra-thick rubber facing. Applied in a continuous piece under tension, Spiralagging is anchored to the pulley by a selected adhesive and countersunk bolts for long life and better belt protection.—*American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29.*

Want to Keep Tabs on the Election?

(27) Bemis Bro. Bag Co. is making available to all interested, without obligation, a folder called "Presidential Elections, 1860 to 1952," which shows how all the states have voted in elections since 1860. Recipients of this interesting tabulation, which the company has issued for some years as a public service, also will receive before the elections a second folder designed for "keeping score" on election night. If you'd like a copy, circle 27 on the postage-free card above to have it sent to you.

Latest Equipment Bulletins Available for the Asking

(28) HOW TO SELECT A CRUSHER—The operating cost of a crusher can become prohibitive if the wrong crusher is selected, and since there are many types of crushers and hundreds of variables in materials, selecting the most efficient crusher is no easy matter. To assist "the man who, sometime, may want to select a crusher," the Pennsylvania Crusher Co., Philadelphia 7, offers a handbook with that title that explains in a simple non-technical manner the various crushing methods and where they apply.

(29) CAP LAMPS AND CHARGING UNITS—The Wheat "Forty-Niner" electric cap lamp, together with the new Wheat automatic charging rack, are detailed in a new bulletin offered by National Mine Service Co., Beckley, W. Va. Included are a cut-away drawing of the 64-oz battery, a chart showing relative efficiency over a period of 13 hr, features and specifications. The new automatic charging rack requiring no manual attention is fully described, along with other Wheat charging equipment.

(30) SELENIUM RECTIFIERS—Syntron Co., Homer City, Pa., offers a new bulletin illustrating and describing its line of selenium-rectifier power-conversion units. Covered are specifications of the various models available according to capacity, including those providing up to 550 v DC for mining machinery.

(31) ELECTRICAL CONNECTORS FOR COAL MINING—Bulletin B39-A Joy Mfg. Co., Pittsburgh 22, provides ordering numbers on five different families of electrical connectors; gives pertinent information and application views on safety-circuit power-distribution systems; lists five sizes of cable vulcanizers; describes electrically operated track-switch throwers; and illustrates the latest Joy String-A-Lite portable lighting assemblies.

(32) ABRASION - RESISTANT CASTINGS—New 24-p booklet "Ferrous Castings for Abrasion Resistance," suggests a system for analyzing service conditions and selecting a ferrous alloy with suitable mechanical properties for the job. Tables included list the properties of various alloys, the properties or minerals commonly worked (gangue and vein), and service-tested applications in many industries, specifying service, function, part and recommendations. Available from American Brake Shoe Co., New York 17.

(33) VERTICAL TURBINE PUMP FILM—A new sound stripfilm (slides on continuous 35-mm strip), entitled "The Vertical Turbine Pump Story," is available from the Worthington Corp., Harrison, N. J., for showings to interested groups. The film, containing 165 frames in color, is synchronized to a 20-min narration and points out the four inherent characteristics of vertical turbine pumps which make them particularly suitable to applications other than the already popular use in deep wells. Showings will be arranged by the company or through its vertical turbine pump distributors.

(34) DUST AND FUME CONTROL in various industries is the subject of a comprehensive brochure published by American Wheelabrator & Equipment Corp., Mishawaka, Ind. This booklet, "Industry Relies on Dustube for Efficient Dust and Fume Control," tells how cloth-tube-type dust collectors are handling complex problems in 33 typical installations, including coal cleaning.

(35) CABLE-REEL JACKS for lifting and holding heavy reels featured in a new Bulletin AD-26 from Duff-Norton Mfg. Co., Pittsburgh 30, are designed for handling cable reels from 20 to 90 in in diameter and are available in capacities of 5, 10 and 15 tons. The bulletin gives data on four types of cable-reel jacks.

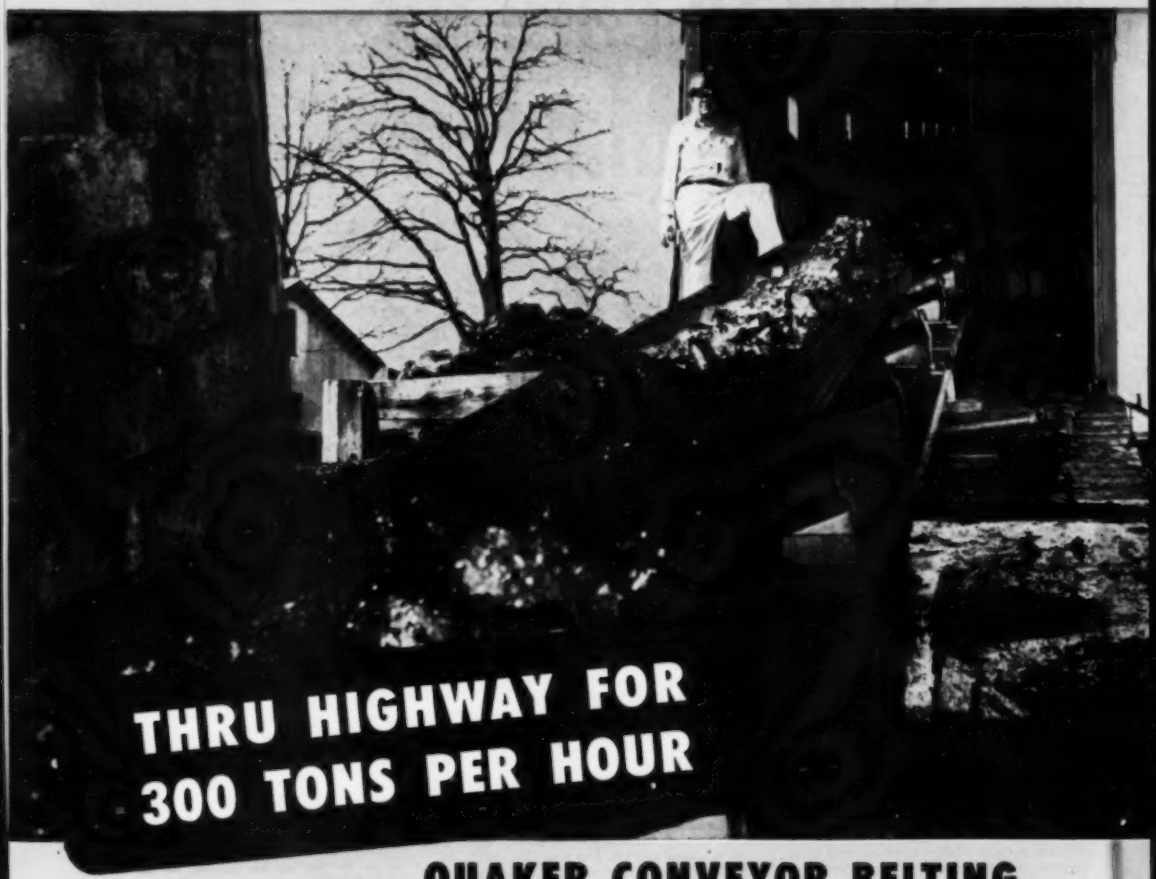
(36) MOTORS, GENERATORS AND TRANSFORMERS in a wide range of sizes carried in stock and available for immediate shipment are covered in a new 36-p bulletin offered by the Electric Equipment Co., Div. of Norry Electric Corp., Rochester 1, N. Y.

(37) AIR COMPRESSORS—Bulletin E-237 describing all types of 105-cfm Davey compressors, announced by Davey Compressor Co., Kent, Ohio, covers gasoline-, diesel- and electric-powered trailers; "Auto-Air" truck-mounted units; and industrial stationary machines. Complete mechanical specifications are included in a handy reference table.

(38) INSTRUMENTS — Bulletin Index 100-A is an index of technical literature available from Honeywell's Industrial Div. It consists of both a numerical listing and alphabetical cross index for specification sheets, instrumentation data sheets, catalogs and other literature. Included in the alphabetical index, are articles from *Instrumentation*, the manufacturer's quarterly publication. From Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia 44.

(39) FOR STOCKPILE LOADING—Haiss Hi-Capacity coal loader can handle 5 tpm, according to a new bulletin giving full design and operating details issued by the George Haiss Mfg. Co., Inc., Div. of Pettibone Mulliken Corp., New York 51. The units are offered with rubber-tired wheel or crawler mountings and with a swivel-conveyor discharge.

QUAKER *Production-eered** BELTING



QUAKER CONVEYOR BELTING

HAULS MILLIONS OF TONS...NO WEAR...CUTS COSTS

Hauling underground . . . cutting overhead—that's the record of QUAKER Conveyor Belting in the Quality Excelsior Mine at Greenwood, Arkansas. More than 1500 tons of coal hauled every day over this 36 inch by 3700 foot belt have left no signs of wear on its tough, wear resistant construction. Traveling at the rate of 350 feet per minute, this QUAKER Belt speeded up production.

North, east, south, and west QUAKER Conveyor Belts are being specified by leading mines for more production . . . QUAKER "Production-eered" Belts have proved their value for cutting costs and keeping output up.

Above or below the ground QUAKER has the proper "Production-eered" rubber product to reduce maintenance and cut overhead: flat transmission and V-belts; air, water and steam hose; sheet packing; mine cable guards and many others.

***Production-eered** Every Quaker Industrial Rubber Product is "production-eered"—engineered to provide maximum life, efficiency and production on each type of installation. For timely production tips get your copy of the new free booklet "Production-eered" . . . for Greater Output.

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QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

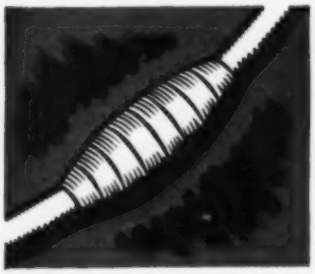
PHILADELPHIA 24, PA. · BRANCHES IN PRINCIPAL CITIES

How to care for Mining Machine Cables

1 Buy cables that can carry the required current without overloading or overheating. They should be flexible (having sufficiently fine strands) for the intended use.

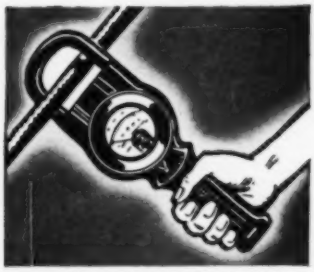
2 Keep voltage in the working sections up to standard.

3 Keep bonding up to standard and provide adequate returns.

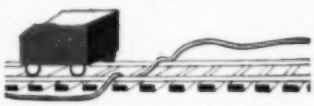


4 Splice properly and vulcanize. Splices should be strong electrically and mechanically and should be well insulated with materials suited to the cable type. The number of temporary splices should be limited and when that limit is reached the cable should be taken out of service and the splices made permanent by vulcanizing. Conductors should be spliced or joined so that they are mechanically and electrically secure without solder and then, unless an approved splicing device is used, they should be soldered with a fusible metal or alloy, or brazed or welded. Sharp edges and points should be avoided in soldering, welding or brazing. All joints and free ends of conductors should be covered with insulation equal to that on the conductors.

5 Avoid overheating. Do not overload. Keep cables as short as possible. Where possible, as in conveyor work, sectionalize the cables into short lengths, giving due thought to safety in the type of cable connectors selected. Long single cables, such as are used in conveyor mining, should be stored in long, loose loops, preferably on the mine floor, since loops on the rib add to the difficulty of fighting any fire that might occur. Do not pile cable in tight coils. On such equipment and mining and loading machines equipped with reels, attach the nips far enough back to spool off the cable. If that is impracticable, unreel the cable and spread it out on the bottom.

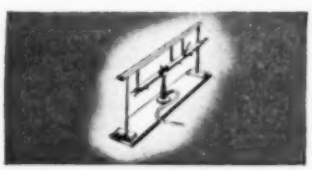


6 Avoid overloading of cables. Where possible, use I.P.C.E.A. recommended current ratings. Where cables are used in one or more layers on a reel, use I.P.C.E.A. recommended factors for reducing the current.

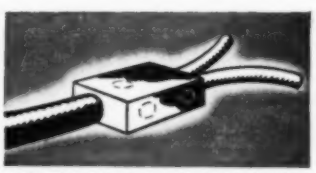


7 Place cables where they can't be run over. Anchor them to prevent jerking, avoid severe twisting and kinking, take precautions against cutting, protect against falls and keep cable tension down.

8 Protect cables with fuses or circuit breakers of the proper rating for the service. Make sure that circuit breakers will operate properly.



9 Use flame-resistant cables wherever possible.



10 Use junction or distribution boxes for making multiple power connections in working places.

UNITED STATES RUBBER COMPANY

U.S. RUBBER — SERVING THROUGH SCIENCE

Electrical Wire and Cable Department

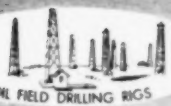
1230 AVENUE OF THE AMERICAS • NEW YORK, NEW YORK

AEROQUIP SELF-SEALING COUPLINGS

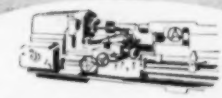
AND FLEXIBLE HOSE LINES

BUSES AND TRUCKS

RAILROADS



OIL FIELD DRILLING RIGS



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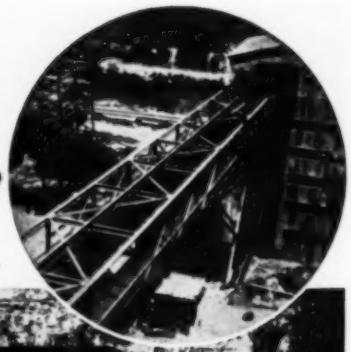

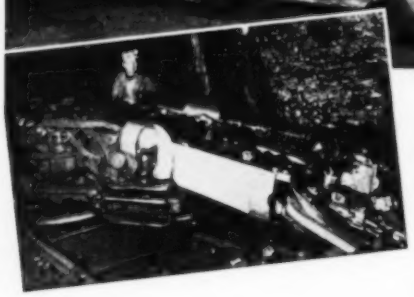

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NEWS Round-Up

Anthracite Research Advisors Cover All Industry

Fifty-eight men, representing industry, labor, scientific groups, educational institutions and the Commonwealth of Pennsylvania, are helping advise the U. S. Bureau of Mines in its long-range anthracite research, John W. Buch, chief of the Bureau's Anthracite Subregion, reported July 10.

Serving without pay, the men have accepted assignments on committees which meet periodically to survey the most critical problems of the anthracite mining industry and to formulate suggestions for special studies at the government's new Anthracite Research Laboratory at Schuylkill Haven. Buch is chairman of the principal group, the 23-member "Anthracite Industry Group Committee," which reviews findings of three subcommittees, totaling 38 members. The subcommittees are composed of authorities in the fields of mining, preparation and utilization of anthracite.

As outlined by Buch, some of the problems to be studied by the Research Laboratory are:

Mining — Increased mechanization, greater recovery of pillar coal in thick beds, new roof-support methods, backfilling to minimize subsidence or caving, use of shaped charges of explosives to increase blasting efficiency and hold charges within permissibility limits.

Preparation — Cleaning and washing action of launder screens, dewatering and drying of fine sizes, removal of cinders from anthracite obtained in reworking spoil banks and from strip mining, grinding of larger sizes of coal, and a survey of existing cleaning methods used in anthracite so their effectiveness can be measured.

Utilization—Operation of anthracite-burning equipment in the Research Laboratory building at Schuylkill Haven, use of anthracite for preventing frost damage in fruit-growing and truck-farming areas, wider use of anthracite in the chemical and metallurgical fields, and basic research regarding the structure and properties of anthracite to develop possible uses for the fuel.

Cell Produces Electricity

Although still in the experimental stage, an electricity-producing fuel cell has been patented by the Pittsburgh Consolidation Coal Co. and is said to have good long-range possibilities in direct conversion of gas from coal into electricity. The coal is heated to produce gas which is fed into the cell, equipped with electrodes. Chemical reaction generates electricity and also heat, which keeps the reaction moving.

Safety Bill Made Law

Congress has passed the McConnell mine-safety bill into law. For a summary of the law's provisions, the background of its drafting and the attitudes of men deeply concerned for safety, see the next three pages.

UMWA Loses Court Tests

A Federal appeals court in July upheld the National Labor Relations Board which ordered the UMWA to cease and desist from unfair labor practices. The United States Fourth Circuit Court of Appeals ordered enforcement of two NLRB orders, as follows:

United Construction Workers, an affiliate of UMW District 50, and three union members, were ordered to cease interference with timbermen delivering mine timbers to Carbon Fuel Co., Carbon, W. Va. The court said there was evidence that the union picketed the company's property to compel the company to stop buying timber from non-union timbermen. NLRB held this was in violation of the Labor-Management Relations Act.

Also, the court ordered UMW, District 31, six locals at Fairmont, W. Va., and one local at Wolf Summit, W. Va., to cease unfair labor practices in restraining and coercing the employees of S. H. Swaney, Inc., and L. E. Cleghorn, Clarksburg mining firms, in the exercise of their rights guaranteed by the act. The court said it did not appear that the respondents were in any manner prejudiced, as claimed, by the joinder of proceedings affecting the Swaney and Cleghorn employees.

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LNC Offers Coal to Dealers For No Cash

A Lehigh Navigation Coal Co. financing plan that for the first time in anthracite practice permits the dealer to pay for his coal as he sells it and the consumer to buy through a finance-company installment plan, was unfolded July 15 to more than 12,000 dealers in the anthracite marketing area in New England, New York, New Jersey, Pennsylvania and Canada. Designed to stimulate anthracite sales at all levels, the plan permits coal to move from the mines through the dealer to the consumer's bin without interruption because of lack of cash at either level. Under the dealer phase of the plan, called "Pay when you sell," the dealer sends his note for the invoice price and freight charges of each coal shipment, due in 1 yr from the order date. He also is automatically credited with the regular discount on all coal bought under this plan.

Glen O. Kidd, vice president—sales, Lehigh Navigation Coal Co., said the plan permits dealers to lay in an inventory at no cost to them until the coal is sold, even to the freight charge. "By the fifth of each month," Mr. Kidd explained, "dealers send a statement to the company accounting for previous month's sales and a check to cover the cost and freight charges of the coal sold." Previous arrangements called for the dealer to remit in full within 30 days after purchase.

At the retail level of the plan, Lehigh Navigation has arranged for a national finance company to handle consumer purchases on a liberal installment plan which embodies several features not previously applied to the hard coal business, such as no down payments with 12 mo to pay, the initial installment due 30 days after purchase. The arrangements will be handled from some 300 finance company offices throughout the market area, thus increasing LNC's sales force by the 750 finance-company salesmen. Furthermore, dealers will be relieved of the details of handling customer credit and collection, thus giving them more time to devote to sales activities.

The new plan is a permanent adaptation of the "Buy Now—Pay Next Winter" plan which LNC put into effect last spring. That plan resulted in the company's present sales volume running 28% ahead of last year's sales and 39% ahead of the rest of the industry, Mr. Kidd reported, in pointing out that the new plan should further increase sales volume and eventually double it while providing benefits for dealers and consumers.

Disaster Prevention . . .

- **What the new federal safety law provides**
- **How industry representatives view it**

CONGRESS VOTED APPROVAL of a federal mine safety law July 2 and sent the measure to President Truman, who signed it July 16. The vote in the House of Representatives was 185 to 37. There was no teller count in the Senate.

The bill adopted is the McConnell measure, a compromise that had the support of a large segment of the coal industry, the U. S. Bureau of Mines and the UMWA. An influential group of operators, notably the Southern group, opposed the measure.

The bill that went to the President was designated the Neely bill (S. 1310). The text, however, is that of the McConnell bill (H. R. 7408), amended in some particulars. Under a suspension of rules during the last crowded days before adjournment, the House adopted the McConnell bill under the Senate number and Senator Neely, who sponsored a much more rigid mine-safety bill, accepted the McConnell compromise, clearing the way for Senate adoption.

The federal mine safety law marks the end, temporarily at least, of a long and sometimes bitter controversy in which the Bureau of Mines and the UMWA had sought strong federal controls over mine safety.

The new law exempts strip mines, and deep mines employing 14 men or fewer, from its provisions. The measure denies the Bureau the power to make rules and regulations and rests that power solely in Congress. Wherever state laws provide greater safety than federal requirements, state laws prevail.

The new measure seeks to prevent major disasters—fires, explosions, inundations and man-travel accidents that kill five persons or more. About 10% of coal-mine accidents are chargeable to this category. Sponsors of the measure explain, for instance, that the safety law is drawn to protect miners from fires or explosions caused by faulty equipment but does not protect them from accidents caused by absence of guards or other protective devices. Matters in this latter category are left to state laws.

To guard against impulsive or ill-advised closing of mines by federal inspectors, grounds for closing are specifically set forth in the law. The law makes adequate provision for appeal. It creates a new board of review and provides for appeal, under varying circumstances, to the review board, the Director, USBM, and the U. S. Circuit court.

Punishment for failure to shut down a mine ordered closed, willful failure to bar unauthorized persons from a closed mine or refusal to admit authorized inspectors and other officials to a mine is punishable by a fine up to $2,000. No prison terms are provided in the measure.

What the Federal Coal-Mine Safety Act Does

Mines Affected

All deep mines employing more than 14 men underground.

Intent of the Act

Prevention of major disasters. Act is aimed primarily at explosions, fires, floods and man-trip and man-hoist accident and covers roof and rib support along active travelways, ventilation, rockdusting, electrical permissibility, fire protection and certain miscellaneous items.

Making Rules

Power to make rules and regulations limited to Congress. USBM makes no rules or regulations.

Cooperation

Federal inspectors required to cooperate with state agencies and inspectors.

Role of States

General safety, health and welfare of miners left to states. State laws requiring greater safety than federal law supersede federal law.

State Agencies

States with mine-inspection and safety agencies may ask Director, USBM, for approval of agencies. Approved agencies must employ adequate and competent inspectors, assign inspectors to work with federal inspectors and make information reports to USBM.

Frequency of Inspection

At least once a year.

Making Inspections

In states where USBM approves state safety agencies, state inspector must accompany federal inspector, except in mines where inspection is urgently needed and bringing state inspector to scene would delay inspection.

Unsafe Conditions

Operator must be given reasonable time to correct unsafe conditions not constituting immediate danger.

Closing a Mine

1. Federal inspector may close mine or area, even without concurrence of state inspector, if he finds danger that disaster will occur immediately or before the imminence of such disaster can be removed. Closing order must be issued immediately, in writing. Closing must be based on facts revealed by inspection.

2. Federal inspector may close mine or area, but only with concurrence of state inspector, if violations dealt with in the act are found sufficient even though imminent danger is not involved, or if operator has not acted with reasonable dispatch on violations cited in earlier inspection.

Appeal to State Agency

If state inspector did not accompany federal inspector, operator may ask for examination by state inspector. If state inspector does not concur in closing, operator, federal or state inspector may ask U. S. District Court to name independent inspector. Finding of any two inspectors prevails.

Appeal to Board

Act sets up Federal Coal Mine Safety Board of Review—three men named by President and confirmed by Senate, one for operators, one for union and one neutral. Neutral man must be graduate engineer with mine experience or practical engineer with 5 yr experience and not employed in industry for at least 1 yr before appointment. Without going through Director, USBM, operator may apply for annulment or revision of order closing section of mine or classifying mine as "gassy." Law specifies grounds for appeal.

Appeal to Court

Any final order by Board of Review may be appealed to U. S. Circuit Court and then to Supreme Court.

Penalties

1. Operator failing to close mine or area when ordered: up to $2,000 fine.

2. Operator's agent permitting unauthorized persons to enter closed mine or closed area: up to $2,000 fine.

3. Person wilfully entering closed mine or area: up to $2,000 fine.

4. Responsible person who refuses to admit federal or state inspectors to mine: up to $500 fine.

Gassy Mines

If methane has been ignited or if federal inspector finds as much as 0.25% methane in open workings, mine is gassy. Mines designated gassy by states or operated as gassy are classified gassy under federal law.

Black Powder

Black powder prohibited, except that mines in states expressly permitting black powder have 6 mo to comply with law.

Anthracite Provisions

Ventilation requirements somewhat modified; open shots permitted under special defined conditions.

"Will always do all in our power to improve safety"

JOSEPH E. MOODY, president, Southern Coal Producers' Association

THE SOUTHERN COAL PRODUCERS' ASSOCIATION objected to the passage of the McConnell Mine Inspection Act for several reasons.

We do not believe that the enactment of this law will improve mine safety. We believed that some of the sponsors of the McConnell bill were motivated by more than an interest in safety in their efforts to have the bill passed.

It was claimed that the bill was the answer to the problem of mine disasters. Congressman Augustine Kelley in the hearings on the bill said that the passage of the McConnell bill would *guarantee* that there will be no future mine disasters. We did not, and do not, believe that the passage of any legislation will guarantee safety in the mines.

We do not believe that the federal government, through the use of a bureaucratic agency, should be given control over any industry to the extent that the McConnell bill could affect the bituminous coal industry. We do not believe that a federal inspector, because he is a federal inspector, has any special ability.

The responsibility for mine safety belong to the states and the passage of this act was a major step toward the further control of all industry by federal bureaucracy, by the use of "safety" to get federal interference. It is a major breakthrough in the destruction of states' rights and power to control their affairs.

The states have established a remarkable record of improvement in mine safety and should be encouraged to continue the job. There is always room for improvement and the Congress should have passed legislation to strengthen the states' efforts. Instead, we have an act that can destroy the state departments of mines. Unless there is used the ultimate in skill of administration and the greatest finesse in application of the terms of the act in the field, the damage that will be done to mine safety in the United States by the use of this act will set us back many years.

We do not believe that the McConnell bill was enacted as a safety measure, but only because many members of Congress felt that a bill labeled "Mine Safety" presented an opportunity for political advantage in an election year.

The bill is now law and we will endeavor to abide by the terms of that law. We will always do all in our power to improve the safety of our mines.

"New law is good . . . Industry should work to make it effective"

JAMES HYSLOP, president, Hanna Coal Co. Div., Pittsburgh Consolidation Coal Co.

THE FEDERAL COAL-MINE SAFETY ACT recently passed by Congress was produced after 6 mo of argument and endeavor on the part of various groups working in Washington. As a result of the general demand throughout the country that something be done to reduce the incidence of tragic coal-mine disasters, bills which had been before Congress for several sessions, giving police powers to the Bureau of Mines, were vigorously pushed after the West Frankfort disaster. These bills, known in the Senate as the Neely bill and in the House as the Price bill, were very brief and would have given the Bureau of Mines power to make its own regulations and the authority to enforce such regulations.

The attitude of the mine operators was unanimously in opposition to legislation of this type on the theory that no bureau should be given the arbitrary authority to make regulations governing any industry. On the other hand, a large group of operators believed that some drastic action was needed to greatly reduce the number of mine disasters and that these disasters could be greatly reduced by law if effective and reasonable enforcement could be achieved. These operators furthermore believed that eventually a federal mine-safety bill was certain of enactment and that the danger was very great that ill-considered legislation, such as the Neely and Price bills, would be passed in the heat of excitement that always follows a serious mine disaster.

In the House of Representatives, a special subcommittee was appointed by the Committee on Labor and Education to study the problem of mine-safety legislation. This subcommittee was characterized by a most objective approach to the problem and a diligent effort to arrive at the facts. Extensive hearings were held. Practically all of the members of the subcommittee were present during these hear-

ings and displayed clearly that they considered the problem an important one and were anxious to arrive at the best possible solution. After listening to a great deal of testimony, this subcommittee designated its chairman, A. B. Kelley, of Pennsylvania, and the ranking Republican, S. K. McConnell, of the same state, to draft a bill designed to provide specific regulations which would be calculated to eliminate those conditions that seem to be the predominant causes of mine disasters. Mr. McConnell and Mr. Kelley called in representatives of the various operator groups to advise them of their purpose and ask for suggestions.

The operators were roughly divided into two groups—those who were opposed to any extension of the powers of the Bureau of Mines and those who believed that some type of new federal law was indicated. Those operators in favor of a new law organized a committee which finally represented about half of the industry, with the support of the operators' associations in Pennsylvania, northern West Virginia, Illinois, Ohio and various independent operators. Ths committee agreed to work with the House subcommittee in an effort to produce the type of bill contemplated.

The Bureau of Mines and the UMWA also agreed to assist in this effort. One of the outstanding features of the work that was done was that these four groups were able to work cooperatively, and while sharp differences of opinion naturally were manifested at various points, a real effort was made to produce a piece of legislation that would fulfill the objectives.

Almost 3 mo of careful work was done by these groups, always in close collaboration with full and free discussion of all the problems involved. What was known as the McConnell bill came out of this effort. The bill finally passed by Congress was the McConnell bill except for the Barden amendment, which provided for closer collaboration between the state departments and the Bureau of Mines in the enforcement of regulations.

The bill finally passed is known as the Neely bill but, as explained, has the content of the McConnell bill. It is aimed at the elimination of mine disasters caused by explosions, mine fires, floods, man-trip and man-hoist accidents. The bill religiously attempts to avoid any effort to control ordinary mine accidents and the regulations are confined to those problems related to the hazards enumerated.

The bill attempts to be highly specific and to cover every situation known to be contributory to disaster hazards. Recognizing that, in rare instances, disaster hazards may occur which are not anticipated by the regulations, the Bureau is given the authority to close down mines whenever its inspectors find conditions which, in their judgment, indicate that there is imminent danger of the occurrence of a mine disaster. The authors of the bill believed that the occurrence of unusual hazards, not covered by the specific terms of the regulations, would be very rare and that ordinarily any police action by the Bureau would result from the violation of the specific regulations.

In this law, the Bureau is given no authority whatever to make its own regulations. The bill is not a bureaucratic measure, since it provides government by law rather than by a bureau.

I believe that the new law is a good one Of course, it is not perfect. However, it is my belief that if its terms are enforced, the occurrence of mine disasters will be very greatly reduced. If this hope is realized, the lives and property saved will amply repay for the effort expended in the production of this law.

No law can succeed unless those to be governed believe in it and are willing to do their part to make it work. It seems to me, therefore, that the industry owes it to itself and to the Nation to exert every effort to make this law succeed.

There is no reason in the world why the state departments and the federal Bureau of Mines should not work cooperatively. It should be the objective of the mine operators and the UMWA to do everything within their power to bring about this desired cooperation. Furthermore, both management and labor should attempt to assist the Bureau in the difficult task of enforcing the regulations. I am sure the Bureau will welcome the sincere suggestions of any group.

On the basis of the fine cooperation between the operators' committee, of which I was a member, the UMWA, the Bureau of Mines and the members of Congress who worked on the job, I am encouraged to believe that it will be possible to make this new law a great success. Everyone agrees that the objective of eliminating mine disasters is a noble one. It is my belief that even those who were opposed to giving any type of police power to the Bureau of Mines will really cooperate actively in an effort to determine whether or not this new law is the solution to the problem of mine disasters.

UNITED MINE WORKERS JOURNAL

Issue of July 15, 1952

"IT [The Federal Coal-Mine Safety Act] is not as good a bill as S. 1310, the Neely bill, but it presents the best that could be obtained under the circumstances and the mineworkers are grateful to McConnell for the great fight he made for the passage of his bill."

Texas Gas Asks Rate Increase

Texas Gas Transmission Corp. filed a new application July 8 with the Federal Power Commission for authority to raise its wholesale natural gas rates by about $8,650,000, the increased rates to become effective Aug. 8, 1952. The new application replaces one rejected 10 days before by FPC, the commission at that time holding that Texas Gas should not file among its anticipated increased costs a United Gas Pipeline Co. rate increase which the FPC has rejected. The increase is necessary, W. T. Stevenson, president, Texas Gas, explained, because of the added costs of gas purchased from suppliers and higher operating expenses. The proposed increase would be apportioned among customers in an 8-state area from Louisiana to Ohio.

Synthetic Profit Seen

A new study of the possibilities of synthetic liquid fuels from coal with more emphasis on the production of chemicals apparently will show that a 10% profit can be made by a plant costing $40 to $50 million dollars, according to W. C. Schroeder, assistant director, U. S. Bureau of Mines. The new study, it was reported, will be completed about the end of August.

Ten Killed in Two Accidents

An explosion at a Nova Scotia mine killed seven men and a cavein at a Pennsylvania anthracite mine claimed three lives July 9. The explosion occurred at a colliery of the Dominion Steel & Coal Co., near Glace Bay, N. S., in workings about 3 mi under the Atlantic Ocean. One of the victims died of severe burns and shock at a hospital. An investigation is underway in an effort to determine the cause. At Mount Carmel, Pa., three men were suffocated reportedly by a fall of coal dust and silt mixed with water, at Germantown colliery, Raven Run Coal Co.

CORRECTION—In the report of the annual meeting of the American Mining Congress (Coal Age, June, 1952, pp 177-178), manufacture of the Meco-Moore longwall machine was erroneously attributed to Mavor & Coulson Ltd. The machine is a product of the joint efforts of Anderson Boyes & Co. Ltd., The Mining Engineering Co. Ltd. and Flemington Electrical Works, Scotland.

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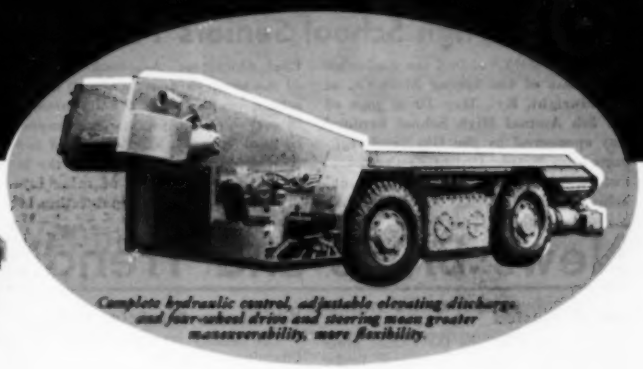

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High School Seniors Tour Inland Steel Mine

SOME 180 BOYS visited the coal-mine operations of the Inland Steel Co. at Wheelwright, Ky., May 10 as part of the 5th Annual High School Seniors' Day sponsored by the Big Sandy-Elkhorn Coal Mining Institute in cooperation with the Mayo State Vocational School and the Big Sandy-Elkhorn Coal Operators' Association. Purpose of the program is to acquaint the high school seniors with the opportunities in coal mining. After being transported in mine cars 9 mi underground to the haulage portal at Price No. 1, the boys heard an explanation of mine layout and toured the shop, coal-testing laboratory, central preparation plant and service center, where a buffet lunch was served. In the photos above, Bruce Atkinson (left), Inland Steel engineer, discusses mine layout, and Clyde Cannon, section foreman, demonstrates a loading machine in the shop at Wheelwright.

News Briefs and Trends

Bridge Blasted

Continued efforts by the United Mine Workers to organize Clay and Leslie counties, in eastern Kentucky, were marked in June by dynamiting of a railroad bridge and an abortive attempt to hold a monster rally. An L. & N. bridge was blasted June 29, about 4 mi south of Manchester, Clay county seat, cutting off traffic on the only line in the county. The rally, scheduled for Manchester on June 30, was supposed to bring in 6,000 miners from eastern Kentucky, Virginia and Tennessee, and preparations included removing women and children and augmented police protection. However, only 400 miners showed up and the day passed peacefully with only oratory from union organizers. Previously, three union organizers were ambushed June 24, bringing a request from John L. Lewis to Kentucky Governor Weatherby to use his power to stop the "reign of terror."

In Tennessee, stripping equipment and shop facilities owned by the Arnold Coal Co. was dynamited and burned June 27 at Jellico. Loss was estimated by Ulis Arnold, owner, at $60,000 to $80,000. The dynamiters were unknown.

The Butler-Mercer district of Pennsylvania also was the scene of dynamiting late in June. On June 29, two bulldozers owned by the McCormick Mining Co., Chicora, were destroyed. A third bulldozer and two shovels were saved because the shots failed to fire. On July 1, the tipple of the Sunbeam Coal Co., Hooker, was blasted to the tune of some $20,000.

Bituminous Fatalities Down

The fatality rate per million tons at bituminous coal mines showed a further decline in the first five months of 1952 to 1.00, compared to 1.14 in the same period in 1951. Total fatalities in 1952 were 210, compared to 252 in 1951. In anthracite, on the other hand, both the number of fatalities and the rate per million tons rose in the first five months of 1952 to 49 and 2.97, respectively, compared to 45 and 2.79 in 1951.

Westfield Named Safety Chief

James Westfield, Pittsburgh, was named chief of the Health and Safety Div., USBM, July 17, succeeding J. J. Forbes, now director of the Bureau. Born in Utah and a graduate of the University of Utah, Mr. Westfield has 24 yr service with the Bureau. W. H. Tomlinson, Vincennes, Ind., also with 24 yr service, succeeds Mr. Westfield as chief of the Bureau's Accident-Prevention and Health Div., Region VIII, at Pittsburgh.

BCR Miner Sold

Rights to manufacture and market the continuous mining machine developed under the Mining Development Program of Bituminous Coal Research, Inc., have been sold to the LeRoi Co., Milwaukee, Wis., according to an announcement July 22, by Charles E. Lawall, chairman of the mining development program, following a decision to this effect at a meeting of program subscribers.

The LeRoi Co. plans to build and market the continuous-mining machine as rapidly as possible. Mining research will be continued by the BCR Mining Development Committee to develop new and improved methods of bituminous coal mining.

Reitz Plans Town Sale

Some 275 houses in central Somerset County, Pennsylvania, will be sold by the Reitz Coal Co., at prices ranging from $250 to $400 per room, with tenants having the first purchase option and Reitz employees second. Then, any remaining houses will be made available to the general public. In making the announcement June 27, William H. Ritter, Reitz, president, said that for the most part there was no longer a need for company houses. A few will be retained for use by officials of the company.

New Scholarships Announced

Five scholarships recently have been made available annually to children of employees of the Tennessee Products & Chemical Corp., Nashville, Tenn. The scholarships are renewable, when merited, for 4 yr of college. In recognition of the untiring efforts of Carl McMarlin, president, in the cause of employee education and welfare, the board of directors directed that the fund be designated the "Carl McFarlin Fund."

In Utah, G. R. Watkins, general manager, United States Fuel Co., Salt Lake City, recently announced that it was again offering an annual 4-yr scholarship for study in coal-mining engineering, open to sons of company employees and to any graduate of an accredited high school with grants of $500 per yr to recipients.

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Only the Peterson TFR* Filter gives you this fine dried coal, this ultimate moisture reduction without excessive degradation. The TFR* method combines top feed with high frequency vibration of the filter cake and discharge under vacuum. No excessive degrading force is used. You get coal free of chunks, slabs; coal that intermixes freely; coal that looks treated in loaded cars. It makes water clarification cheaper and easier, and reduces stream pollution.

Peterson makes conventional disc filter as well as the TFR.* Our design is based on 37 years of engineering experience in this field, half of it spent designing and developing many other outstanding filters now on the market.

SEE HOW THE TFR WORKS – SEND FOR POCKET MODEL

With the actually-moving "Pocket Model" you can "operate" the TFR* filter yourself, and see how it works, how it gets the coal so fluffy and dry, in a continuous intermixed ribbon. Let us send you the "Pocket Model" gratis today with full information on every detail of the TFR* filter.

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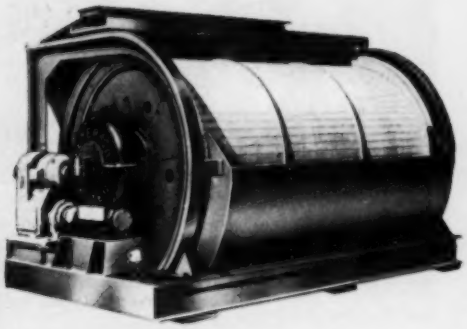
37 Years of Experience in Filtration
137 Motor Avenue, Salt Lake City 1, Utah

PETERSON TFR* FILTER



NOT JUST ANOTHER VACUUM FILTER . . .

Here are the distinctive features of the TFR Filter.

Lowest Moisture Without Degradation

Air brushes the moisture off – high frequency vibration squeezes more moisture out of the cake. No flinging or impinging action assures little degradation and low maintenance with the slow-moving drum, at 2 MPR (two minutes per revolution).

No Filter Cloths

Stainless steel Tri-Rod screens last for years without replacement. No Blinding. Slot openings stay clear, assuring constant results over months of operation.

Surge Overflow for 100% Overload

The Top Feed Reservoir has surge overflow, permitting unattended operation. Excess feed simply overflows back to the circuit with no interruption. Fluctuations in feed are automatically taken care of in the reservoir by a change in pool level. Start and stop filter under full load.

No Blow-Back

The cake is "discharged under vacuum" so there is absolutely no release of moisture at discharge.

Handles Coal from 3/8" x 0 to 20 mesh x 0

The wide range of sizes that can be handled simultaneously on the TFR* give uninterrupted production, and yet minimum surface moisture, clear effluent and minimum operating cost.

*TFR—Top Feed Reservoir—Patented and Patents applied for.

EDWARD FERRY (seated left), Stirrat No. 19; E. S. York, Micco; F. M. Cook, Omar No. 4; Floyd Varney, Omar No. 5; Romeo Silvester, Norton; Otis Carnes (standing left), Omar No. 4; D. J. Joines, Omar No. 4; H. M. White, W. Va. Dept. of Mines; Earl Hopkins, No. 19; T. R. Workman, vice president—operations; Ray Hayes, Norton; M. D. Collier, general manager; E. L. Wiley, safety director, and Dord Spradlin, No. 19L.

West Virginia Coal & Coke Officials Win Safety Awards

Recognition for safety achievements was accorded officials and mines of the West Virginia Coal & Coke Co. at the company's Safety Award Dinner at the Omar (W. Va.) clubroom June 6. National Coal Association Certificates were presented by T. R. Workman, vice president—operations, to company supervisors, as follows:

Arthur Smith, Otis Carnes, W. C. Stepp, Henry Napier, Ralph Adkins, Jake Stewart, Herman Meyers, Harlan Ellington, Arnold Phillips, Okey Thompson, W. R. Lawson, Roby Wilson, Leslie Evans, Chester Goins, Paul Pichardo, Earl Jordan, Mark Curtis, Homer Hardin, Clyde Browning, Jack Shannon, W. M. Kovinsky, George Dotson, Jr., Herbert F. Greene, Harold Shrader, Louis Silvester, C. A. Coster, John Nameth, K. H. Taylor, W. A. Wood, Robert Jarrell, Robert Brooks, Elza Mundy, O. W. Bell, Frank Efant, E. W. Kitchen, Albert McChristian, W. C. Adkins, Bill Williams, H. W. Hatfield, Claude Wheeler, Ray Rucker, John Thern, Joe Woodard, Boyd Trump, Millard Steele and W. B. Bolling.

Joseph A. Holmes Certificates were awarded to West Virginia Coal & Coke mines, as follows:

Micco No. 3—Jan. 18, 1945, to Jan. 15, 1952, and continuing, without a fatal accident while producing 1,002,832 tons of coal.

Omar No. 4—Feb. 10, 1948, to Dec. 31, 1951, and continuing, without a fatality in the production of 1,570,022 tons.

Omar No. 5—Feb. 8, 1949, to Nov. 21, 1951, when the record ended after 1,829,523 tons were produced without a fatality.

Stirrat No. 19—March 4 1949, through Jan. 8, 1952, without fatal accidents in the production of 1,515,252 tons.

Norton No. 2—Best record in the company. April 21, 1945, to Dec. 31, 1951, and continuing, for 2,486,499 tons without a fatality.

New Mine Developments

Wheeling Steel, Pitt-Consol Form New Company

Pittsburgh Consolidation Coal Co. and Wheeling Steel Corp., Wheeling, W. Va., June 25 arranged for joint ownership of Harmar and Oakmont mines, to be taken over July 1 by the newly formed Harmar Coal Co. from the former owner, Consumers Mining Co., Harmarville, Pa. All land, plants and equipment have been transferred to the new owners. It is reported that George C. Trevorrow, vice president-operations, Consumers Mining Co., will continue in charge under the new arrangement.

Crawford No. 1 mine, Bridgeview Coal Co., Uniontown, Pa., has been abandoned after exhaustion of reserves.

First coal mined at Gilliam mine, Gilliam, W. Va., under the new management of the Arlington Pocahontas Coal Co. went over the tipple July 8. Purchased from the Gilliam Coal & Coke Co. July 1 for an undisclosed sum, the mine will be operated in conjunction with other Arlington operations with few changes in personnel. Officers of Arlington Pocahontas are: H. A. Henthorn, Sr., president; Walker R. Carter, vice president; W. D. Cassidy, Jr., treasurer, and W. Don Henthorn, secretary.

U. S. Steel Opens 10,000-TPD Mine at Munson, W. Va.

The U. S. Steel Co., Pittsburgh, Pa., has announced the opening of Gary No. 14 mine at Munson, McDowell County, W. Va., in the Pocahontas Nos. 3 and 4 seams, which currently is producing 4,000 tpd of metallurgical coal and is planned for an output of 10,000 tpd after development is completed. The coal will be shipped to the company's cleaning plant at Alpheus for preparation, and will be used at U. S. Steel mills in Indiana, Illinois and Ohio.

Rastrelli Coal Co., West Newton, Pa., has acquired the New Scott Haven mine, formerly operated by New Scott Haven Fuel Co., Sutersville, Pa. Located near West Newton in Westmoreland County, the mine will be known as Ocean No. 1.

Oakmont mine, one of the mines to be operated by newly-formed Harmar Coal Co., was sold in June by Hillman Coal & Coke Co., Pittsburgh, to Consumers Mining Co., reportedly for $823,000. Consumers had operated the mine under a lease arrangement since 1948.

Bright Shade Coal Co., Manchester, Ky., recently organized by Arlington Grace and Nancy Becknell with capital stock valued at $100,000, will develop coal land near Manchester. Shipments will move over the L&N R.R.

White Wood Coal Co., Manchester, Ky., with $50,000 capital, recently was organized to develop Clay-County coal lands by Charles Rose, W. E. Becknell and Arlington Grace. L&N R.R. serves the property.

Mohawk mine, West Mohawk Mining Co., Kittanning, Pa., and Cherry Run mine, Superior Cherry Run Coal Corp., Sligo, Pa., recently ceased operations, according to reports. In 1950, Cherry Run produced 55,205 tons, and Mohawk, 48,623 tons.

In Kentucky, Sterling Lanier, president, Norton Coal Corp., Nortonville, announced June 18 the closing of Nortonville No. 1 mine because of the status of the market, top-heavy assessments and heavy taxes.

Baker mine, Glen Alden Coal Co., Scranton, Pa., the only remaining active Glen Alden mine in Lackawanna County closed July 1 because of high operating costs, the company said. About 570 of the 800 employees will be affected, but a majority of these will be able to find employment in the company's Luzerne County mines. About 230 employees will be retained at Baker to maintain the property, fight a 5-yr-old mine fire and operate the breaker, which prepares coal from other mines.

Pine Coal Co., Widnoon, Pa., has taken over the operations of Mech No. 9 mine, Mech Mining Co., Widnoon.

Jeffrey Mine, Freeman Coal Mining Corp., Herrin, Ill., closed recently after 49 yr of operation. A new mine at Johnston City, is to begin operations in the fall.

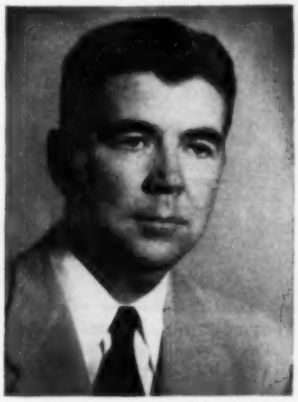
Personal Notes

E. F. Miller to Westmoreland

E. F. MILLER, formerly assistant manager of Cia. Carbonifera de Sabinas, Rosita, Mexico, a totally owned subsidiary of American Smelting & Refining Co., has been appointed vice president in charge of West Virginia coal mines and properties of the Westmoreland Coal Co., Madison, W. Va., June 1. Mr. Miller has been active in the coal-mining industry since his graduation from West Virginia University School of Mines in 1931.

Salvati Advanced

THE BOARDS OF DIRECTORS of the Island Creek Coal Co., Huntington, W. Va. and Pond Creek Pocahontas Co., Huntington, W. Va., at their meetings June 24, announced that their board chairman, James D. Francis, at his request, was relinquishing active duty. Raymond E. Salvati (above), who has been with these companies 30 yr and has held the position of president and chief administrative officer of both since 1949, will take over the executive duties heretofore performed by Mr. Francis. Mr. Francis will remain as a member of the board of directors and the executive committee.



Lynch Opens Consulting Office

EDWARD A. LYNCH, formerly director of personnel, Philadelphia & Reading Coal & Iron Co., recently opened offices at Pottsville, Pa., to provide consulting services on public relations and industrial relations to management. He will continue to serve P&R as a client. Mr. Lynch's experience includes 4 yr as a newspaperman, 15½ yr as personal secretary and assistant to Thomas Kennedy, vice president, UMWA, and 7 yr with P&R.

Stahl Retires After 50 Yr

C. R. STAHL, labor relations manager, Eastern Gas & Fuel Associates, Mt. Hope, W. Va., retired June 30 after 50 yr in industry. He has been with Eastern and its predecessors for 43 yr serving as assistant general manager, division superintendent and later as assistant to the vice president and head of labor relations.

Homan and English Retire

H. S. HOMAN (left), executive secretary of the Big Sandy-Elkhorn Coal Operators' Association, Pikeville, Ky., since 1935, retired July 1. **T. W. ENGLISH** (right), labor advisor since 1941, retired June 1. In 1933, Mr. Homan helped to organize Big Sandy-Elkhorn association, the first in the state set up to handle negotiation of wage contracts and to arbitrate grievances. On July 17, he became secretary of the Southern Appalachian Coal Operators' Association, Knoxville, Tenn., while C. W. Davis, former secretary, succeded him in the Big Sandy association. Mr. English will continue to serve in an advisory capacity and as a member of the Arbitration Board.

More Personals on p 171

ROOF-BOLTING AND GAS—James Westfield (left), USBM; Joseph E. Bose, Linton Summit Coal Co.; Edward Thomas, USBM; John Stachura, Enoco Collieries, Inc.

INDIANA'S MARKET FUTURE—C. Richard Templeton (left), Templeton Coal Co.; W. G. Stockton, Walter Bledsoe & Co.; David Ingle Jr., Ingle Coal Corp.

Mining, Markets and Safety Indiana Institute Themes

CONTINUOUS MINING AND SAFETY—A. Lee Barrett (left), Joy Mfg. Co.; Birch Brooks, institute vice president; Harvey Cartwright, institute secretary; M. F. Cunningham, Goodman Mfg. Co.; William Butts, Indiana Bureau of Mines and Mining; Nathaniel Kirk, Snow Hill Coal Corp.

Reactivated after 10 yr, Indiana Institute delves into continuous mining, safety in general and through roof-bolting, what constitutes a gaseous mine, and the market future of the state's deep mines

SOME 300 INDIANA coal-mining men and guests were present for the reactivation of the Indiana Coal Mining Institute at the Terre Haute House, Terre Haute, Ind., June 21. Operations of the institute were suspended in 1942 with the onset of World War II, and were resumed with continuous mining, safety, roof-bolting and markets as the topics.

The institute is sponsored by the Indiana Coal Operators' Association, and general arrangements were handled by Harvey Cartwright, commissioner for the operators' association and institute secretary-treasurer. Birch Brooks, institute vice president and vice president, Viking Coal Corp., presided over the technical sessions, followed by a dinner at which James Westfield, chief, health and accident prevention, Region 8, U. S. Bureau of Mines, Pittsburgh, was the speaker of the evening.

CONTINUOUS MINING

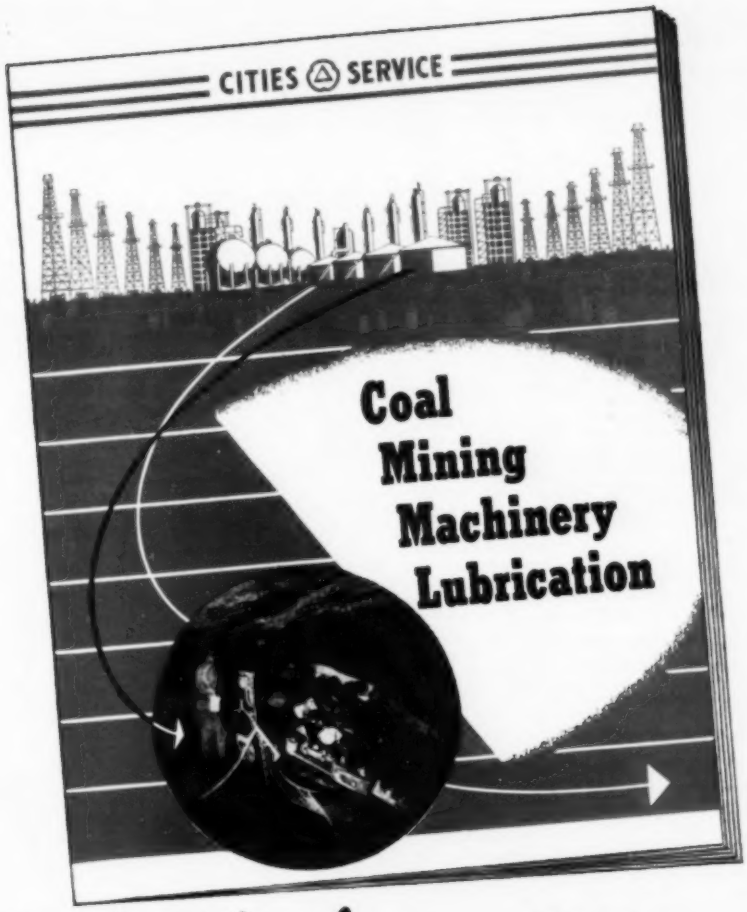
Citing the prospects for increased coal consumption in the future. A. Lee Barrett, research engineer, Joy Mfg. Co., led off the continuous-mining session with the statement that developments in equipment and resultant increases in efficiency are good preparation for the opportunities of the future. Steady progress has been made in continuous mining and now about 160 machines are in service. The future for continuous mining is good and, he declared, practically all coal will be mined by some variation of the continuous method in the next 10 or 15 yr.

Development of continuous machines has had its headaches, but now, Mr. Barrett stated, most of the goals of reliability, low maintenance and ease of operation have been attained. Still further developments of a major nature are to be expected, though the future still has its problems. Two of the big ones are:

1. Development of mining systems that will permit maximum production with continuous machines.

2. Development of transportation equipment that will permit continuous operation.

With further progress, Mr. Barrett concluded, the mine of the future will be greatly condensed, with all-round



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TODAY, MORE THAN EVER BEFORE, THIS LUBRICATION BOOK CAN PROVE EXTREMELY USEFUL IN EVERY MINING OPERATION

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INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

benefits in efficiency, cost and safety.

Reviewing the development and present status of continuous-mining units, Maurice F. Cunningham, vice president, Goodman Mfg. Co., pointed out that two principles — ripping and boring — have emerged as the leaders at the present time. Boring is the more nearly continuous, and seems also to have advantages from the capacity and size-of-product standpoints. However, the flexibility of the ripping-type machine is a major advantage.

Size of product, he declared, is of major importance since it affects both the marketing problem for the mine output as well as cleaning-plant design and cost. Continuous machines require more power, make more dust, which is costly to handle, and require frequent overhaul. However, they provide fast development, permit in most instances a reduction in cost of roof support, and cut cost of accidents. The biggest problem involved in their use is transportation.

Questions that must be asked before going to continuous mining are:

1. Can you use it in your seam? This requires careful study of all the factors involved.

2. Can you clean small sizes with your present facilities or, if not, what will it require in capital investment?

3. Can you sell the increased output of small coal at a profit?

4. Can you finance the cost of the new equipment?

It all boils down to a question of tons per man, Mr. Cunningham declared. What will tons per man be compared to the old system? In many instances conventional equipment can do as well. In the final analysis, continuous machines today are not a panacea for all ills. They will help where they can be used and they will help more and more as time goes on and manufacturers further improve the machines.

MAKING MINING SAFER

"The reduction in accident rates in the past few years," said William Butts, director, Indiana Bureau of Mines & Mining, "may be attributed to many factors. Among them, the most important are:

"1. Discovery of hazards through inspection that had previously been overlooked or ignored.

"2. Inclusion in collective agreement of the federal mine safety code.

"3. Provisions in union agreements establishing mine safety committees on the local level with authority vested in them to inspect and recommend improvements to management.

"This is a plan or blueprint for our war on mine accidents, but no plan of operation and, I might say, no plan for safety education, can succeed as long as it is merely a plan or theory." Making planning effective, Mr. Butts declared, involves:

1. Sincerity of purpose by management.

2. Banishment of the idea that accidents happen. They are caused.

3. Training men to think safely and thus develop the safety habit.

4. Eliminating all physical hazards.

5. Adopting and enforcing safe working methods.

6. Constant, close cooperation at all times between the miner, and operator, state and federal agencies and insurance companies.

7. "But the greatest contribution in any accident-prevention program is made by the worker who resolves in his own mind that he will perform his assigned duties in such a way that he will return home safe."

Men get their first safety training in the home, declared Nathaniel Kirk, safety engineer, Snow Hill Coal Corp., Terre Haute, but as they grow older they tend to forget these early teachings. Pointing out that safety means efficiency, Mr. Kirk said that while a great deal had been done to stimulate cooperative effort, the ultimate in that direction had not been reached.

Inspectors, he continued, should be welcomed as additional pairs of eyes to uncover hazards. Top management must make those down the line realize that it means business in safety. Foremen must train their men. Safety cannot be attained through fear. Education is the answer. The most-wanted foreman is the safe foreman.

Safety pressure can cut accidents. At one mine, when 10 men lost their lives in 28 mo, a full-scale safety campaign made possible 3½ yr of operation without a fatality. Roof falls remain the major problem. The need is better face protection. Proper bolting provides real help but better supervision also is needed. Haulage accidents also will be improved as bolting spreads.

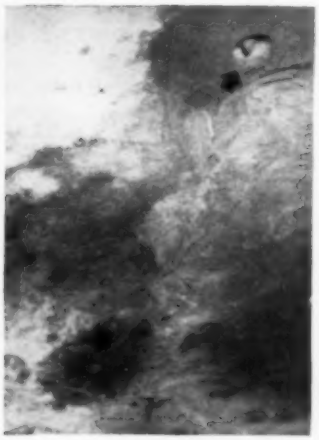
It is not true, Mr. Kirk pointed out, that accidents happen only to new men and at new mines. As examples, he reviewed the five latest major disasters—all at old mines and all preventable. Concluding, he declared that safety is really attained when both supervisors and men resolve in their own minds to work safely.

ROOF-BOLTING

Citing West Virginia experience showing major declines in roof-fall injuries as a result of bolting, Edward Thomas, chief, roof-control section, U. S. Bureau of Mines, stated that bolting has been made possible only by mechanical mining, and that bolting will be the practice in practically all mechanical mines in a few years. Mr. Thomas doubted if hand-loading mines can bolt because of the capital investment required.

Bolting is no exception to the need for study of the problem before adopting the plan, and for system after its adoption. The lead held by the British in roof-fall injuries reflects this latter principle, since the system of mining generally employed requires systematic support at the face. Otherwise production would be impossible. In bolting, as in all other forms of support, Mr. Thomas states, we must

(*Continued on page 166*)



Roof Bolts Still Hold After 34 Yr

J. C. BALDWIN, retired mine superintendent, Bluefield, W. Va., holds a straight roof bolt installed in 1917 in thin slate at the Sagamore colliery of the Pocahontas Fuel Co., McComas, W. Va., while he was superintendent at the operation. The bolt removed last fall for photographing was still in good condition. The other photo (right) shows several of the countersunk bolts still holding the roof. Mr. Baldwin is the inventor of a special reamer designed to taper holes to fit tapered-end roof bolts that is to be marketed by the West Virginia Armature Co. (*Coal Age*, July, p 156).

JOY SAL-37T

TELESCOPIC FEED—LONG
STEEL CHANGES—LIGHTWEIGHT
LOW AIR CONSUMPTION

JOY SAE-9IT

TELESCOPIC FEED—LONG
STEEL CHANGES—SHORT
OVERALL LENGTH—HEAVY DUTY

THESE ROOF-BOLTING STOPERS GET THE JOB DONE FASTER and CHEAPER

You can cut your roof-bolting costs away down with Joy Stopers . . . with constant-pressure telescopic feed and centralized control.

In the first place, the long steel changes that Joy Drills afford mean *fewer* steel changes for your roof-bolters and more time spent in actually drilling . . . *more hole footage per shift.* What's more, fewer steel sizes need be carried in stock and hauled to the face.

In the second place, Joy Stopers have several exclusive features: such as *cadmium-plating* inside and out for rust-protection, closer tolerances and easier run-ins . . . and the famous *Dual Valve* that "makes air do more work". These features make for greater efficiency, longer service life and less maintenance.

Joy builds a complete line of roof-bolting equipment—air-operated or hydraulic. ● *Call on us for details . . Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

SPECIFICATIONS

	SAL-37T			SAE-9IT			
Steel Changes	30"	36"	42"	30"	36"	42"	48"
Weight	63#	65#	67#	98#	103#	106#	109#
Collapsed Length	25"	28"	31"	23¼"	29⅝"	32⅝"	35⅝"
Extended Length	61"	70"	79"	57½"	73⅛"	82⅛"	91⅛"

Consult a Joy Engineer

JOY

W&O CL-4301

COAL COMBUSTION, RECOVERING GERMANIUM—Seated: G. E. Keller (left), Commercial Testing & Engineering Co., and R. H. Allen Jr., French Coal Co. Standing: B. E. Tate (left), National Cash Register Co.; Mr. Prosser; and Dr. A. J. W. Headlee, West Virginia Geological Survey.

COAL PIPELINE, MULTI-SEAM MINING—Harry S. Gay (left), Gay Coal & Coke Co.; F. R. Zachar, Christopher Coal Co.; C. H. Williams, Red Jacket Coal Co.; and W. A. Haslam, New River Co.

West Virginia Groups Hold Joint Meet

Institute and A.I.M.E. Section hear latest on . . .

Recovering germanium from coal ash

Moving coal through pipelines

Profiting through time studies

Mining several seams at once

CONCENTRATION OF GERMANIUM, the rare metal which can be used to displace vacuum tubes in electronic apparatus, in the upper and lower parts of coal beds and experiments with hydraulic transportation of coal were spotlight subjects at the meeting of the West Virginia Coal Mining Institute and the Central Appalachian Section, A.I.M.E., June 20-21, Huntington, W. Va. Other papers dealt with industrial engineering in coal mining, control of stream pollution, combustion properties of coal and multiple-seam mining.

LEAD-OFF SESSION—Seated: F. K. Prosser (left), Norfolk & Western Ry., and C. R. Bourland, New River Co. Standing: J. F. Trotter (left), Trotter Coal Co.; Acel Garland, Island Creek Coal Co.; H. F. Hebley, Pittsburgh Consolidation Coal Co.; and G. R. Spindler, West Virginia University.

James F. Trotter, president, Trotter Coal Co., Morgantown, and president of the Institute, opened the technical meeting. Fred K. Prosser, general coal traffic manager, Norfolk & Western Ry., and chairman of the A.I.M.E. Section, was toastmaster at the banquet, where J. D. A. Morrow, president, Joy Mfg. Co., spoke on European conditions and problems. Chairmen and co-chairmen of the three technical sessions were: C. R. Bourland, vice president (operations), New River Co., and H. E. Mauck, general superintendent, Olga Coal Co.; George E. Keller, manager, Commercial Testing & Engineering Co., Charleston, and Rhese M. Allen Jr., French Coal Co., Bluefield; Harry S. Gay Jr., president, Gay Coal & Coke Co., and W. A. Haslam, assistant to the vice president, New River Co. R. G. Lazzell, engineer of research and development, Island Creek Coal Co., presided at the luncheon, where Stewart H. Smith, president, Marshall College, Huntington, spoke on "Education Under Fire."

DOLLARS FROM GERMANIUM?

Germanium oxide, now worth $142 per lb, is commercially recoverable in coal ash from selected coals, according to A. J. W. Headlee, chief chemist, West Virginia Geological Survey, who presented a paper, "Germanium and Other Elements in Coal and the Possibility of

Another mine goes PAYLOADER

— LOADS TRUCKS FASTER
—AVOIDS COAL BREAKAGE
— IS BEST FOR CLEANING OFF COAL
— MAINTAINS ROADS
— PUSHES, PULLS, LIFTS

• The evidence in favor of "PAYLOADERS" keeps pouring in from coal mines, both strip and underground — proof of profitable performance at many tasks, and here's one from Walter Beisser, President of Ten-X Coal Co., who says his 4-wheel drive Model HM has proved much more satisfactory than other equipment in many ways. It loads trucks faster from stockpiles, loads high trucks better and does not break the coal in the process.

He further states that *this powerful 1½ cu. yd. tractor-shovel is the best equipment he has ever had for cleaning off the coal at the strip mine — and he's tried dozers, graders and other equipment.* Additional valuable "PAYLOADER" uses at Ten-X are road maintenance, moving tools and supplies, pushing, towing and lifting.

You'll find plenty of ways to keep a Model HM profitably busy at *your* mine too, and your "PAYLOADER" Distributor is ready to give you all the facts. See him today or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.

Free CATALOGS are yours for the writing, on any size "PAYLOADER": — 4 wheel drive Models HM (1½ yd.) or HR (1 yd.); Rear wheel drive HY (¼ yd.), HF (¾ yd.) or HE (½ yd.); Front wheel drive HAH (15 cu. ft.) or HA (12 cu. ft.).

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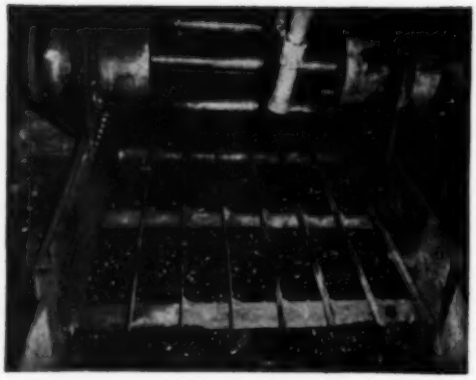
HEWITT-ROBINS



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No Other Machine Can Match The HEWITT-ROBINS ELIPTEX® DEWATERIZER For Performance!

Performance Records Prove—the Hewitt-Robins Eliptex Dewaterizer, with its patented deck, *leaves as little as 9% surface moisture on −⅛" x 0" coal.* For larger sizes, 5" and 6", the results are even better—the larger the coal, the more surface moisture is removed by the Eliptex Dewaterizer. These records are the result of day-in and day-out operation of full-size equipment in the coal industry . . . not of laboratory scale-models.

Saves Space—Saves Money: The Eliptex Dewaterizer is compact, efficient—costs as much as 85% less than some dewatering mechanisms. This represents a big saving for you in space, capital investment and maintenance.

Discover For Yourself—learn how the Hewitt-Robins Eliptex Dewaterizer can help you dewater coal more efficiently—more economically. Write for Bulletin No. 129-A for complete information.

HEWITT-ROBINS HR INCORPORATED

STAMFORD, CONNECTICUT

INDUSTRY MEETING—

A Special COAL AGE Staff-Written Report

Recovery." Analyses have been made on the ash from 596 1-in cubes of coal from 35 columns cut from 16 coal seams in West Virginia. Germanium oxide in the ash samples averaged 0.013%. Percentages for thirty-four oxides of other elements were also determined in the analyses.

It was found that germanium concentrations, unlike other elements, occur in a few inches at the bottom and at the top of the coal seam. It appears that germanium was absorbed by the coal as water entered, carrying germanium salts in solution. Since the germanium is not detectable in the top and bottom slates or other materials in contact with the coal, this metal apparently is in the coal rather than associated with the ash content of the coal. When the coal is burned in the laboratory at less than 740 C, most of the germanium remains as ash. Thus the burning is a first step of concentration for analysis or recovery.

Regarding the possibility of recovering germanium from ash in power plants, it is not known how much is lost in high-temperature combustion but the estimates run as high as 70%. However, according to Dr. Headlee, compounds can be added to coal to retain most of the germanium in the ash if necessary.

Dr. Headlee suggested that the bottom three inches of the coal can be selectively mined, washed and burned to produce an ash rich in germanium. A prospective buyer has indicated that ash containing 0.2% germanium is worth $75 per ton. Dr. Headlee believes that considerable tonnage of ash worth $25 or more per ton can be prepared. A content of 0.05% is probably the minimum having a recovery value. Answering a question, Dr. Headlee said that 500 tons of bottom coal could produce 4 lb of germanium.

MOVING COAL BY PIPELINE

For major coal consumers represented by the electric utility industry, the coal pipeline "has significant prospects for extending to coal consumers the benefits achieved by the producer without seeing them engulfed by the continuing appetite of the railroads for additional revenue," said Dr. H. S. Turner, director, research and development division, Pittsburgh Consolidation Coal Co., Library, Pa., in his paper, "Hydraulic Transportation of Coal." Dr. Turner covered the economic reasons for the study, history of earlier studies and experiments, and the pilot and full-scale commercial-size pumping plants of his company. Over $1,000,000 already has been spent by that company on its investigation. The scientific and engineering data that have been developed are not being released.

For a modernization and mechanization program, Pittsburgh Consolidation spent $43,000,000 from 1946 to 1951 inclusive. This amounts to 30c per ton of coal produced. Expenditures such as these have kept the industry's head above

COAL MEN ON THE JOB . . .

"Masters of Safety" Supervisors at Red Jacket Coal Corp.

ACCIDENT-FREE CREWS IN 1950 AND 1951 (top photo): Ed Simpkins (seated, left), Nathan Maynard, Frank Melmige, Herbert Williamson, L. E. Ratliff (standing, left), Arthur Joyce, Bill Curry and Jim Maynard.

ACCIDENT-FREE CREWS FOR 1 YR (bottom photo): Carl Cook (standing, left), Ivory Killen, J. H. Damron, Paul McCoy, Clyde Hammond, James Hite, Golden Barrett, Jay Walls, Lewis Simpkins, Tom Copley, Jim Hutchinson, Walter Edwards (seated, left), Leonard Lawson, Fred Thomas, Tom Franklin, Rufus Sipple, Willard Graham, Ance Kennedy, P. G. Willis and Dorsel Steele.

water. Although coal is now selling for the same or less than in 1948, the railroads have increased rates until the freight on a ton of coal from nothern West Virginia to the major eastern markets exceeds the price of the coal at the mine.

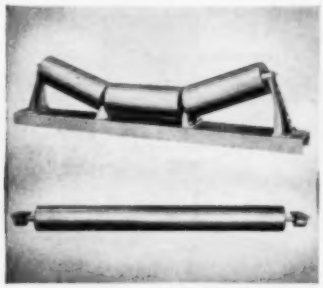
Pittsburgh Consolidation began the study of hydraulic transportation of coal in January, 1950, and in May of the same year started experiments at a pilot plant at Library. By November, 1950, sufficient facts had been developed to indicate that hydraulic transportation cost would probably be attractive in comparison with freight rates over the specific routes of interest to the company.

The next step was construction of a full-scale commercial-size pumping plant at the Georgetown cleaning plant near Cadiz, Ohio. This experimental installation consists of a crushing and screening building, a slurry preparation building, and test loops of 12-in pipe, one loop being 4,000 ft long and the other 2,000 ft. Tests were made on Wilson-Snyder reciprocating-type pumps, such as are used extensively in the oil fields to pump mud, and a slug pump using hydraulic pistons of water was developed in which the centrifugal pump providing the pistons is not exposed to solids.

As a result of company representatives appearing before the Ohio legislature on March 8, 1951, a pipeline company constituted as a common carrier may now exercise the right of eminent domain when moving coal through its pipelines. Speaking of the investment necessary to carry coal hydraulically for 100 miles, Dr. Turner said the slurry preparation would require 17%, the pipeline itself 52%, and the dewatering and drying facilities 31%.

Mr. Gay, chairman of the session, sug-

HEWITT



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More features: Sturdy construction assured by Channel Base, Rigid Truss design—One-Shot Lubrication from either side—Triple Grease Seal —over-sized bearings.

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Greater Selection: Full range of styles and sizes to fit every job requirement.

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Trouble-free: Last longer under the rigors of on-the-job operation.

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Better availability: *What* you want *when* you want it. Strategically located stocks for your convenience throughout the country.

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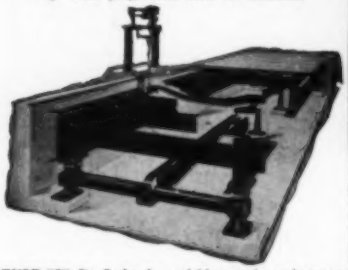
Dependable — Accurate

TRUCK and TRACTOR TRAILER SCALES

TYPE "C. S." *Portable Scale*—easily and quickly set up—with preparation held to minimum



TYPE "S" *Pit Scale*—for weighing trucks and tractor trailers—Platform lengths 18 ft. to 60 ft. inclusive.

WINSLOW SCALE COMPANY

TERRE HAUTE 1, INDIANA

Scale Manufacturers since 1896

Colver Wins Central Pennsylvania Contest

TOP HONORS in the 1952 first-aid contest of the Central Pennsylvania Safety Association were won by the team representing No. 1 mine, Ebensburg Coal Co., Colver, Pa., at Barnesboro, June 21. The Colver team, headed by Glenn Plummer (seated left, above) captain, scored 99.65 points out of a possible 100 to win $350 in cash and a plaque awarded by the Mine Safety Appliances Co., Pittsburgh. Other members of the team are James Graham, Charles Simko, James Roberts, Francis Dabbs, Charles Roberts and Harold McHugh.

Second place was taken by Captain Ronald Griffin's team from Lancashire No. 15 mine, Barnes & Tucker Co., Barnesboro; and third place by Captain William Trexler's team from Sonman Slope, Eastern Gas & Fuel Associates, Portage, Pa.

MOVE MORE COAL AT LESS COST

Atlas 5-ton type F 32" high.

Can be made 28"

The Atlas two-motor 5 ton type F storage battery locomotive is built low to go anywhere mine cars will go. Exposed wheels for easy access. Large battery capacity gives more gathering service per shift. Double reduction spur gear drive in heavy dust-tight housing gives economical maintenance—free service. Ask for details today!

Atlas Engineering service will design locomotives to meet the specific needs of your mine.

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

gested that the hydraulic transportation system might be extended into mines to take coal from continuous miners.

Answering questions, Dr. Turner said that, the coal-producing areas being generally higher in elevation than the consuming areas, gravity would aid in overcoming friction. Also, he said that protected pipe—glass lined, for instance—is so expensive that it might be better to reduce wear by velocity control.

TIME STUDIES SAVE MONEY

Acel Garland, director of industrial engineering, Island Creek Coal Co., speaking of the application of industrial engineering to coal mining, said the coal industry is far behind other industries in the measuring of production and cost effectiveness because it has lacked the impetus given by wage incentives in most of the manufacturing industries. He has found, however, that time study and industrial engineering can be equally effective in mining if properly developed and adequately maintained.

Time studies involve four steps, Mr. Garland said:

1. Analysis of present method.
2. Development of the best method.
3. Measurement of time required.
4. Appraisal of performance.

These studies can be used to reduce the inefficiencies and waste common in most mines. In the production line from working face to the railroad car, all operations must be coordinated and integrated to attain maximum efficiency. In general, time studies are used to:

"EUC" PERFORMANCE Pays Off

IN MINES and QUARRIES

"Eucs" are designed and built for moving coal, rock, ore, overburden and heavy excavation at the lowest cost. The simple but rugged construction of Euclids, combined with large capacity, ample power and speed, provide efficient off-the-highway hauling of practically any material.

Euclids are standard equipment in many leading open pit mines and quarries, and on construction and industrial work. Owners know that Euclid staying power and continuous operation result in more loads hauled in less time at lower cost.

Ask your Euclid distributor for data on quarry or open pit jobs similar to yours. There is a Euclid to meet your requirements for off-the-highway hauling work.

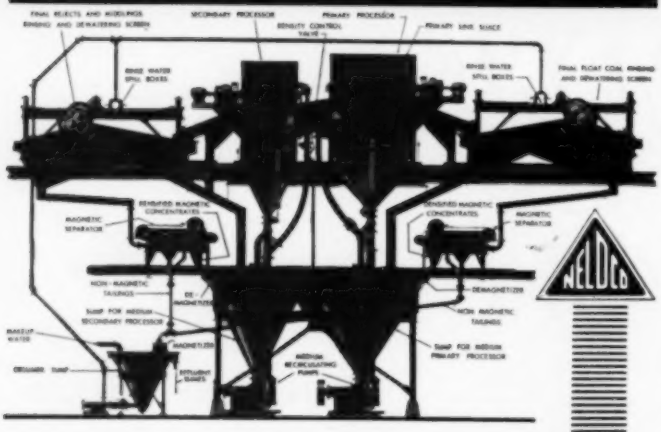
Rear-Dump Euclids—Capacity from 10 to 34 tons—diesel engines from 125 to 400 h.p., spring mounted or semi-rigid drive axles—top speed loaded up to 35.7 m.p.h.

MORE LOADS PER HOUR— MORE PROFIT PER LOAD

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

TWO-STAGE COAL CLEANING



The NELDCO Two-Stage Dense Media Processor efficiently produces a clean float product at any desired level of specific gravity down to 1.35 specific gravity and a reject upward of 1.60 to 2.00 specific gravity. The intermediate product lying between the density of the two vessel baths, is therefore isolated and may be crushed for the purpose of releasing laminated impurities, and salable fuel which can be subsequently recovered by recycling the crushed middlings with the raw coal feed through the plant.

The result is the scientific achievement of increased yield and complete control over the quality of both float coal and sink rejects products, with considerable saving of investment cost, operating labor, space and power requirements.

Available in capacities 75—325 tons per hour.

Send for Folder No. 152 which describes the operation of the Two-Stage Processor and also gives dimensions and capacities.

We also design and build custom-built coal cleaning plants in any size—any capacity, either single or two stage separations.

Standardized Packaged Coal Cleaning Plants are available for single stage cleaning in six sizes—capacities 50 to 325 tons per hour. Send for Book No. 151.

NELSON L. DAVIS COMPANY

DESIGNERS AND BUILDERS OF COAL CLEANING PLANTS USING THE DENSE MEDIA PROCESS

343 SO. DEARBORN ST., • CHICAGO 4, ILLINOIS

1. Measure productive effort expended by individual employees and crews.
2. Measure productive capacities under all conditions and determine the output that machinery can produce if operated at best advantage.
3. Determine sources of waste in physical effort and production.
4. Analyze methods and equipment to point out improvements needed.
5. Analyze crew requirements and establish minimum or the most effective crew quotas.
6. Establish standard production quotas under specific mining conditions.

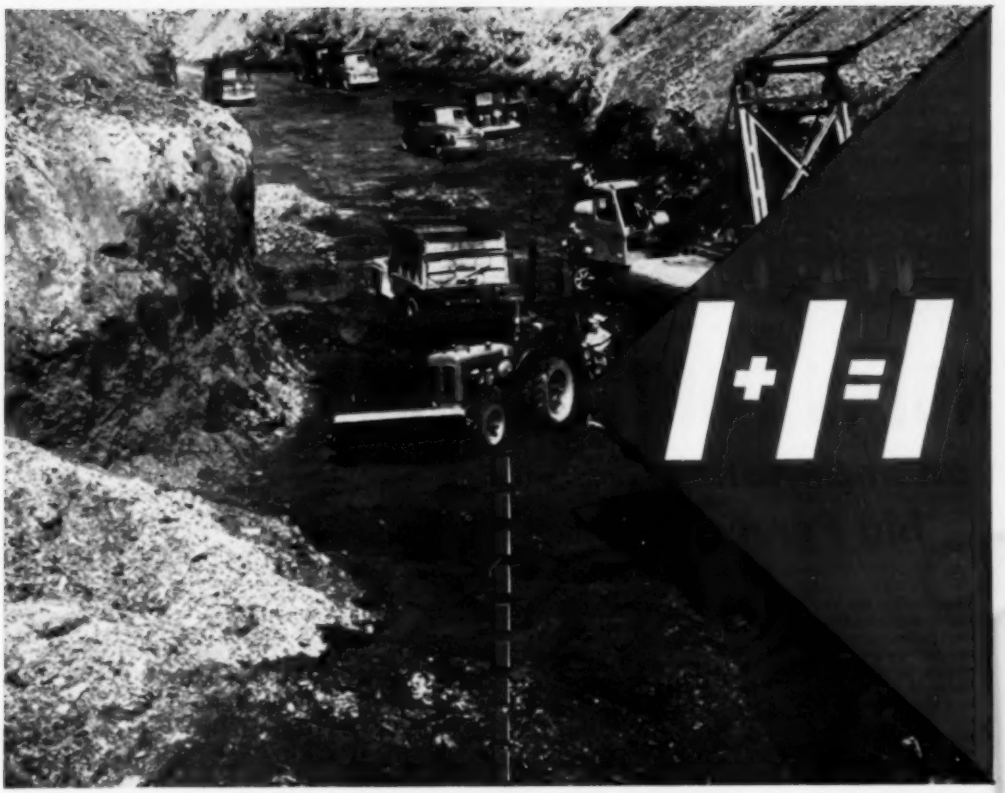
Answering questions, Mr. Garland elaborated as follows: Labor in West Virginia mines is very good—the best he has encountered in some 20 yr of industrial engineering. Island Creek has been working 12 to 15 yr on procedures. The industrial engineering department has established rather complete standards. The mining sections are visited each week and, with the section foreman being present, a classification or level of production is determined for the immediate conditions.

There is no type of wage incentive except for foremen, whose inspiration can promote desirable competition between crews, Mr. Garland explained. An excellent method of attaining the standards is to remove all reasons for men stopping work. After maintenance is put on an efficient basis and adequate power is supplied, the irreducible delays amount to about 10%. Time-study men stay with foremen to train them and then follow up closely. Better lighting has not been tried as a production increaser, he pointed out.

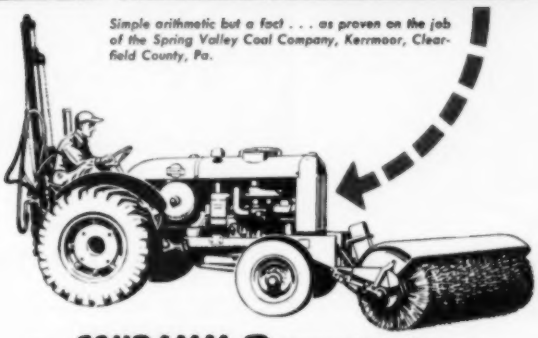
KEEPING STREAMS CLEAN

Henry F. Hebley, research consultant, Pittsburgh Consolidation Coal Co., speaking on "New Developments in Stream Pollution and Control As Related to the Coal-Mining Industry," said there is danger of being stampeded into adoption of standards. For instance, a standard of "not over 8 lb of suspended solids allowed to reach streams per ton of coal produced" was up for adoption in Pennsylvania but was warded off temporarily by efforts of the coal operators. Because of the presence of suspended clays, that standard might create a difficult situation for mines in the Ohio valley. The other nine states in the Ohio River Compact tend to adopt laws patterned after those of Pennsylvania. A recent Ohio law asks each operator to obtain a permit to operate a mine, but some operators think of it as a permit to pollute the stream. Not enough is yet known about pollution—for instance, the interaction of various wastes upon each other—and it is not known whether aquatic life can provide an index of water quality.

A coal advisory committee to the Ohio River Compact has had two meetings at large and two committees have been appointed. Although only six of the Ohio Valley states are cooperating, the organization work is going forward. The four founder engineering societies have set up a committee to report on the water problem of the entire country, Dr. Hebley said.



Simple arithmetic but a fact . . . as proven on the job of the Spring Valley Coal Company, Kerrmoor, Clearfield County, Pa.



The ***SCHRAMM Pneumatractor*** will:

PUSH anything a wheel tractor will push

PULL anything a wheel tractor will pull

POWER anything a wheel tractor will power

PROVIDE AIR for any pneumatic tool that can be operated from a 105 cu. ft. air compressor

A typical coal stripping operation with the SCHRAMM 105 *Pneumatractor* equipped with a steel brush capable of sweeping dirt or overburden to a depth of 2" in one pass. Also a SCHRAMM Pneumafeed mounted on the rear of the *Pneumatractor* providing a self-propelled, self-powered wagon drill with a 7' feed for the operation of drill steels in 6' changes. An ideal drilling rig mounted so that it can be used for drilling vertically down, horizontally, vertically up, or at any intermediate angle.

The real significance of 1 + 1 = 1 can be appreciated when you realize that the SCHRAMM *Pneumatractor* combines all of the features of 1 portable 105 c.f.m. air compressor plus 1 four wheel industrial type tractor. One unit requiring only one operator, one supply of fuel, one set of service parts.

For complete details write for . . . Bulletin NEU-52. There is also available for your own private showing, a color, sound, animated picture showing the SCHRAMM *Pneumatractor* and equipment in action.

SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

SCHRAMM AIR COMPRESSORS

Other industries are as much concerned as coal in the water-pollution issue. Four task groups now are at work: (1) minerals including coal, (2) food, (3) chemicals and (4) a general group that includes miscellaneous industries. At a new plant, the Atlantic Refining Co. has spent $12,000,000 to keep its waste products from polluting the Delaware River.

Dr. Hebley explained that mine acid is a natural product and so is a very difficult problem from industrial wastes. A lot of money has been spent without bringing a solution. If the water could be brought out of the mine right away before the natural process takes place, the problem would be solved. Pumping water rapidly out of a mine on an off-peak power period may slug a stream with enough acid to kill aquatic life. Pumping the mine continuously at a low rate may not harm the stream.

Putting solids into streams can be controlled and the authorities know it, Dr. Hebley said. Head men of the large companies designing and building preparation plants should recognize the need for avoiding pollution and should design accordingly. Answering a question as to the effectiveness of sludge ponds, he said that some have been satisfactory and some not. Requirements are sufficient acreage and a proper time element. In some valleys sufficient space is not available for ponds that will provide sufficient retention time.

SPECIFYING THE COAL WANTED

"We would like to buy a coal on a Btu basis but we can't do that for our power plant," said B. E. Tate, chief engineer, power plant, National Cash Register Co., Dayton, who presented a paper on "Properties of Coal and Their Influence on Performance of Coal-Burning Apparatus." His plant consists of four boilers, each representing an investment of about $350,000. The firing methods include traveling-grate stokers and pulverized fuel. If low-fusion Ohio coal were used for the pulverized firing, the boiler would have to be taken out of service in a week and if high-grade coal such as Powellton were used on the traveling grates, their maintenance would be excessive because high heat causes cast-iron parts to grow. This growth causes elongation of links and sprocket-climbing. Coals of the wrong characteristics could cause an interruption to the power plant that would cost the company $30,000 per hour.

Surface moisture, not total moisture, is the trouble-maker in pulverized firing, Mr. Tate said. The result is clogged chutes to the pulverizers, loss of burner flame and the puff or explosion of re-ignition, which may be serious. Loss of weight of washed coal between the mine and the plant is of no consequence in 1¼ x ⅜-in coal but is about 3% in the ¾ x ⅛-in size. That loss has amounted to about $2,000 on the smaller coal bought by National Cash Register since February.

NOLAN PORTA-FEEDER

an important profit factor in big Pennsylvania mine!

The photo at the right shows a 15 H.P. Nolan Porta-Feeder used for moving cars quickly and efficiently, saving time and money day after day, in a big Pennsylvania mine operated by a major steel company. Installations such as this have shown Nolan Porta-Feeder records of savings as high as 40 minutes per shift in spotting cars for loading, for a large number of coal operators.

The Porta-Feeder mounts between the rails on top of the track ties, secured by jacks that permit quick movability. Little or no excavation or preliminary foundation work is necessary.

Strong, massive construction. No ropes or cables, no inflammable hydraulic oil. Short-shaft delivery of power. Quick movability of entire unit.

The drive is on skids and is connected to the gear head by a strong universal joint and propeller shaft assembly. A sealed drive head allows operation in water up to the base of the rails. Reciprocating pushing dogs deliver constant forward feeding motion.

Write for full details immediately.

MODEL	H. P.	DRAW BAR PULL	SPEED	WEIGHT
NL5N	5	6000	25 F.P.M.	5700
NL7N	7½	9000	25 F.P.M.	5850
NL10N	10	9000	35 F.P.M.	6300
NL15N	15	13000	35 F.P.M.	6750

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WEDGE-WIRE

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SCREEN GUARDS

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LONGER LIFE! Particularly adaptable for use at the discharge end of flumes. The guard is built right into the screen to keep the larger lumps of material above the guard bars permitting only the finer particles to pass over the screen. Precision made.

ECONOMY!! They are non-clogging, non-blinding, strong, rigid, uniform and consequently more economical in the long run.

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A traveling-grate stoker is the most sensitive of all stokers to a combination of size consist and free-swelling index. A high-swelling coal with coarse sizing may give as good performance as another coal of much lower free-swelling index with more fine coal. In addition to the properties already mentioned, grindability and sulphur content can be important. Pulverizer capacity may be cut in half by changing from coal easy to grind to coal of the opposite extreme.

MINING MORE THAN ONE SEAM

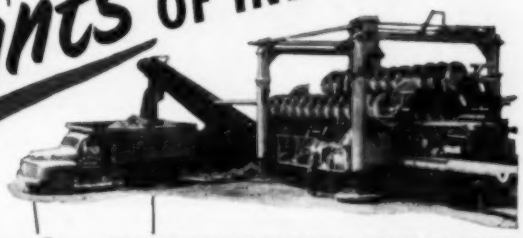
Solid blocks 100 x 100 ft to 200 x 400 ft left 10 to 30 yr ago in the Sewickley seam cause roof troubles in present operations in the Pittsburgh seam 85 to 90 ft below, if the cover is over 200 ft. Observations and photographs of the effects were presented by F. R. Zachar, general superintendent, Christopher Coal Co. In the Sewickley, the blocks cause heaving of the bottom. In the Pittsburgh, the columnar effect of those Sewickley blocks puts weight on the ribs, causing them to break off and the top to fall.

In Arkwright mine (Pittsburgh seam), the company has been unable to keep open entries driven under the Sewickley blocks, though roof bolts helped some by holding until cribbing could be installed on the main haulage road. When another company mining the Sewickley above the Christopher Coal Co.'s Pittsburgh workings bypassed solid blocks of coal protecting gas wells and boreholes, the weight closed the main haul in the Pittsburgh mine, Mr. Zachar reported.

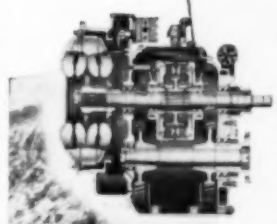
In discussion, C. H. Williams, assistant chief engineer, Red Jacket Coal Corp., Red Jacket, outlined experiences of his company in simultaneous mining of the Upper and Lower Cedar Grove seams (40- to 85-ft interval) since 1912. The company also has mined the Coalburg, which is above the Cedar Grove, and the Alma or Draper, which is below them. The mining is done with complete success by columnizing entries and all workings. Pillar mining in the upper seam precedes that in the lower, and the horizontal distance between pillar lines is equal at least to the interval between seams.

Benjamin Lazer, chief mine inspector, Pocahontas Land Corp., substituting for J. M. Godwin, general manager of that company, discussed multiple-seam mining in southern West Virginia. Thirteen or 14 seams have been mined, and at one operation five seams were mined simultaneously. The Pocahontas No. 3 and No. 4 seams present a close parallel to the Pittsburgh and Sewickley. The No. 4 seam has large areas where the coal is wanting and is replaced by sandstone. Under those areas roof trouble is encountered in the No. 3 seam below. Since it is bad to have the workings crossing those of another seam, an effort is made to correlate the mining of the two. A horizontal distance of 75 to 80 ft is maintained in taking pillars. If the lower seam is mined first and left to settle, the upper can be mined but conditions may be more difficult. With intervals of 150 to 200 ft between seams, there seems to be no effect.

Giants OF INDUSTRY...



Exploit the "TWILIGHT ZONE"



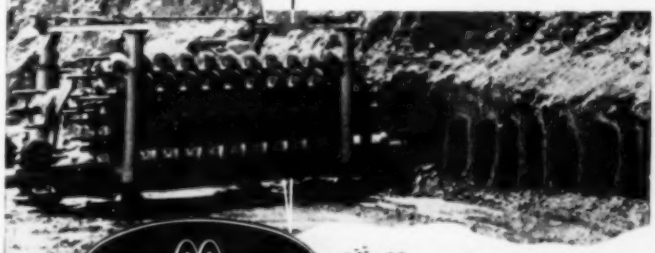
When Compton Inc., Clarksburg, W. Va., developed its huge new 50-ton Compton Coal Auger, a Twin Disc Model 220 Hydraulic Coupling Reverse and Reduction Gear fitted the requirements for a shock-cushioned, quick reversing unit.

Combining two of Twin Disc's successful products—the heavy-duty, shock-absorbing Hydraulic Coupling, and the heavy-duty Reverse and Reduction Gear—the drive has been pronounced "highly satisfactory" by Compton officials, after prolonged production service.

The Auger cuts coal out of walls which heretofore were not exploitable—at such places as the barrier pillars between strip workings and old underground workings . . . the "Twilight Zone". Tests prove that it will repay its cost in a few months.

Such success in providing "the right connection" since World War I, plus the completeness of its line, plus an unmatched service system, have combined to make Twin Disc the world's largest manufacturer of industrial friction and fluid drives.

Hard-cutting, quick-stopping and reversing of this 52-inch—Model 56 Compton Coal Auger requires tough drive links—Twin Disc of course. Reaching 200' into the veins, it digs up to 700 tons per day.



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CLUTCHES AND HYDRAULIC DRIVES

Built for a Long Life . . .
Backed for
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Track to Trackless Economy for LESS...

"Trackless Mining" with conventional cutters, loaders and shuttle cars is recognized by operators throughout the United States as the most economical and efficient mining system that has yet been completely developed for present day coal mining operations.

CONVERTED GOODMAN 460 OR 360 LOADER

CONVERTED LOADING MACHINES

"Lee-Norse Conversions" thoroughly tested and proved during the past decade offer you the opportunity to go "Trackless" now by converting your present track cutters and loaders at much less cost than investing in new mining machines.

CONVERTED GOODMAN 324 CUTTER

CONVERTED JEFFREY 28U CUTTER

CONVERTED CUTTING MACHINES

Before you buy new machines, investigate the advantages "Lee-Norse Conversions" offer you, namely:

1. Lower investment compared with new mining machines.
2. Very little increase in spare parts inventory.
3. Converted machines well known to your operators and maintenance men. No need for re-education.
4. No time lost during change-over. Conversions take less than 30 days.
5. Obsolescence losses due to possible new continuous miner development held to a minimum.

It's Smart to Convert

Lee-Norse Company

CHARLEROI, PA.

COAL MEN ON THE JOB . . .

GULF SMOKELESS COAL CO., Tams, W. Va.: D. P. Hall (left), mine foreman; and H. E. Turner, general mine foreman.

Obituaries

Andrew B. Crichton, 70, president, Johnstown Coal & Coke Co., died suddenly July 9 of a heart attack at his home. Widely known in the coal industry, Mr. Crichton educated himself through correspondence courses prior to opening his own offices as a mining engineer in Johnstown in 1907. In 1914, Mr. Crichton joined with former Judge John E. Evans in the purchase of coal interests near Portage, Pa., which later were incorporated into the present Johnstown Coal & Coke operations. Among other business and civic interests, Mr. Crichton was president of The Crichton Co., a mine equipment concern, Vindex Stores, Inc., Pennsylvania Realty Co., and Super Service Motor Freight Co.

Throughout his career, Mr. Crichton actively participated in the larger affairs of the industry, especially as a consultant on the status of national coal reserves. In 1949 he was named as one of 19 men to represent the United States in a world scientific conference sponsored by the United Nations at Lake Success. In earlier years, Mr. Crichton traveled extensively in Europe and South America to study and report on problems of mine operation and coal utilization.

Harry Copher, 64, general superintendent, Boone County Coal Corp., Sharples, W. Va., died June 23 at Charleston General Hospital, Charleston, W. Va., after a short illness.

Otis E. Linkous, 60, vice president, Vera Pocahontas Coal Corp. and Page Pocahontas Coal Co., Welch, W. Va., died June 18 in a Welch, W. Va., hospital of a heart attack. He was a director of a number of business concerns, including the McDowell County National Bank.

D. Russell Chase, 58, superintendent, Mine No. 10, Pennsylvania Coal & Coke Corp., Gallitzin, Pa., was killed June 14, in an auto accident near Philipsburg, Pa. Mr. Chase began working in coal mines at the age of 12.

WILFLEY
centrifugal PUMPS

30 acres 2 miles

• ***Wilfley Special High Head Sand Pumps*** play an important role in the successful reclamation program of the Hawaiian Commercial & Sugar Co.

• Each year, at the Puunene Mill, 30 to 40 acres of useless, sandy waste land are transformed into productive ground for sugar cane cultivation.

• Soil, removed from mechanically harvested cane by washers, is settled to a sludge of 15% to 25% solids. This sludge, together with a sludge of repulped filter cake, is pumped to the diked waste area. When dry, there remains a 2 to 3-ft. layer of reclaimed cultivable topsoil over the coral sands.

• WILFLEY Pumps, operating on a 24 hour-a-day, trouble-free schedule perform the tremendous task of delivering 300- 500 G.P.M. of cane washer wastes through 2 miles of 6" pipeline to the reclamation area. As a result, wastes which formerly presented a costly disposal problem, are now converted into revenue-producing land.

Wilfley Special High Head Pumps in operation at the Puunene Mill of the Hawaiian Commercial & Sugar Co.

Buy rugged, heavy-duty Wilfley Pumps

whenever the job calls for the efficient and economical handling of sludges, slimes, slurries or sands. The new WILFLEY Model "K" Centrifugal Sand Pump, embodying many important mechanical improvements, delivers higher efficiencies, stepped-up production, worthwhile power savings and lower operating costs. Easy interchangeability of wear parts. Low maintenance costs. Every application individually engineered. Write or wire for complete details.

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Companion to the famous WILFLEY Acid Pump

Upper: Reclaimed land under cultivation.
Center: Diked reclamation area.
Bottom: Waste land to be reclaimed.

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Mining, Markets and Safety Indiana Institute Themes

Begins on p. 150

have system and must not leave anything to individual judgment.

Coal mines now are using around 2½ million bolts a month. It is estimated that around 1,000 mines can use bolting and that the number of bolts eventually will run 6 million per month. To date, only three accidents, killing six men, can be attributed to roof-bolting. Two are attributable to improper methods and the third to improper bolt material.

Bolting results at Enoco Collieries, Inc., Bruceville, Ind., as cited by John A. Stachura, superintendent, include: greater safety, increased unit output, higher coal recovery, increased efficiency in roof-support work, and greater flexibility and mobility in machine operation. This reflects the following advantages:

1. Ability to bolt as close as 6 in to the face, making for fewer falls and greater safety.
2. Reduction in the cost of handling supplies—24% lower in 1951.
3. Greater equipment mobility.
4. Wider and safer haulways.
5. Improved ventilation.

In 26 mo, Mr. Stachura reported, there have been no roof-fall accidents. Coal recovery has increased about 5%, and the company, in spite of varying height of coal, has been able to use high-type equipment throughout the mine. And elimination of wood cap pieces has reduced interference with the preparation process.

Four units now are operated with bolting, and 550 bolts are installed per day of two shifts. Bolt total to date is 110,000, equivalent to 17 mi of bolted territory. Improvements in equipment and methods permit bolting in cycle with little difficulty. Maximum number of bolts installed per crew of two men per shift is 187; the average is 101.

In one territory with two units operating under identical conditions, one with bolting and the other employing a timbering machine, the section where bolting was done was finished in 75 shifts, while the other section required 85 shifts. Even though support cost was greater, the net saving with bolting was 8¢ per ton.

Bolting experience at the Jonay mine was reviewed by Joseph E. Bose, superintendent, Linton Summit Coal Co., Sullivan, Ind., to conclude the bolting session. The first experiment in 1949, using bolts on 45 deg, was a failure. The top at Jonay is better down on the coal than higher up. After a year, it was decided to try again with a shorter bolt placed vertically. This worked, even where bars would not prevent falls. Among the results of stopping falls was elimination of 6 to 18% slate in the coal.

Four units are now on bolting, and the purchase of new compressors, which were mounted on old loader chassis, now permit bolting in cycle. There have been no significant failures, and even where they occur the top gives ample warning. Production per unit has increased, along with coal recovery, and cost consequently

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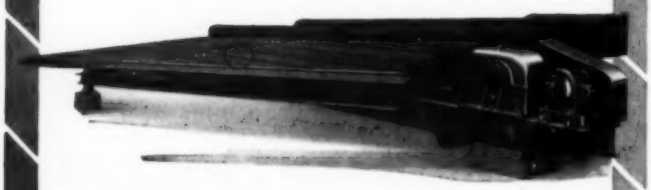

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These points are extremely important where maximum sulphur removal must go hand in hand with optimum ash reduction.

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has decreased. Bolts also are being reclaimed, Mr. Bose reported. The men use safety jacks and the best is 250 per shift under fair top and 100 under bad top, two men. With recovery, the cost of bolting can be cut to one-third what it otherwise would be. The recovery, of course, does not include the expansion shells.

INDIANA'S MARKET FUTURE

The future may have bright possibilities, but the present is not so pretty. Thus W. G. Stockton, division sales manager, Walter Bledsoe & Co., Terre Haute, keynoted the session of the market outlook for Indiana deep mines.

Even though total state production in 1951 was 18,000,000 tons, compared to the average of 19 million for the period since 1918, the prospects are for further declines before the curve swings up again. The deep-mine percentage is now down to 42% compared to 5% in 1917 and while strip-mining costs have increased they have not increased as fast as deep-mine costs. In addition, Indiana faces stronger competition from Ohio, west Kentucky and Illinois, as well as from other fuels—a situation complicated by certain adverse freight decisions and the lower mining costs other areas have been able to achieve, in part because non-union conditions in certain competing fields result in 8 hr of work against 6½ hr for the same or higher pay in Indiana.

On top of everything else, the competitive situation has made it impossible to pass on freight increases to consumers, with the result that the previous operating margin—not net profit—has been wiped out for shaft mines and replaced by an average operating loss of 11½¢ per ton on all deep-mined coal produced in Indiana in 1951.

"We do not have a pretty picture here," Mr. Stockton warned. "True, Indiana, as a whole, has not fared too badly, but the forces of competition have brought the market level of Indiana coal down to the danger point so far as underground commercial mines are concerned . . . What about the future? What can we do about our present predicament?"

Among the moves calculated to improve Midwestern and Indiana position, said Mr. Stockton, are the following:

1. Rectification of certain adverse freight situations.
2. Expansion of the electric-power industry.
3. Cost improvements through continuous mining.
4. Research in conversion of coal to oil and allied products.
5. Possible new forms of transportation that will cut delivered costs, such as pipe lines for fines, or conversion of coal to some other form of energy, such as electricity, oil, gas or chemicals at the mine, to permit moving coal values in less bulky form and therefore more cheaply.
6. Possible legislation putting a floor under prices. This, however, should be favored only as a last resort.

"Necessity is the mother of invention," Mr. Stockton concluded, and success can be wrested out of the trying times ahead by the utmost effort in developing new

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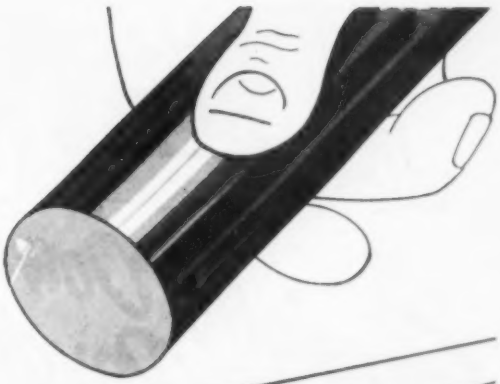

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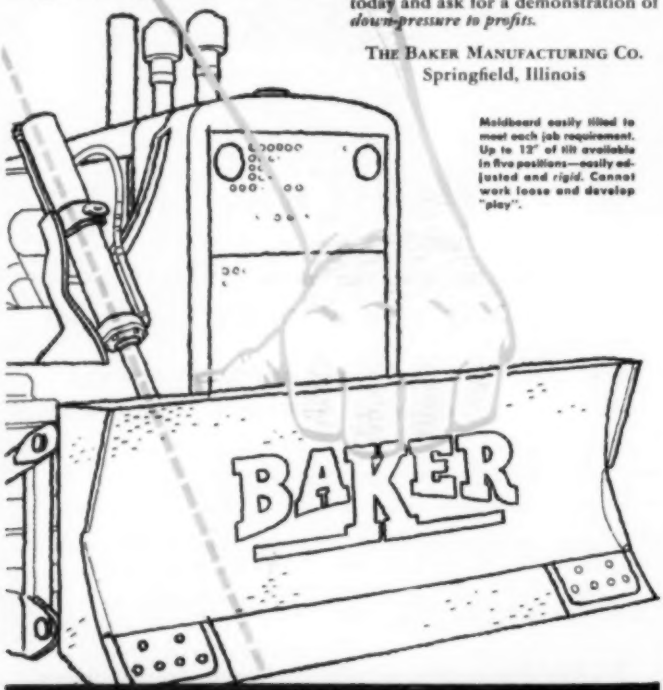

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Baker—The most versatile line of tractor attachments

methods of production, high efficiency in transportation and more intelligent marketing practices. If everybody pulls together, "we'll all do a better job tomorrow and the day after, and we'll soon find the future of the Indiana coal industry looking straight into the sun."

Addressing himself specifically to the domestic problem and noting the selling points for oil and gas burners, David Ingle Jr., president, Ingle Coal Corp., Elberfield, Ind., asked this question: "Have we anything to sell?" The domestic situation, he reported, is really serious. Block or district heating might provide an answer, and is one of the things that should be looked into, especially since it is difficult to replace domestic losses—and losses in the railroad field—with other business. It is difficult to believe that considering the value coal offers it is a dead duck. Perhaps the basic answer is proper research to develop new markets, intensive selling and intensive effort at the mines to back up research and sales.

Agreeing that Indiana deep mines are presently facing a tough situation, C. Richard Templeton, assistant to the president, Templeton Coal Co., Terre Haute, pointed out, however, that it is now summer, some loss was to be expected in changing from war to peacetime conditions, and there is probably some recession in the picture. However, Indiana still will rely on coal and some business is coming back from oil and gas, while research should help in the domestic and railroad fields.

More important, Mr. Templeton contended, Indiana can take some positive steps by accepting it as a fact that the customer's interest is in the most in Btu for his dollar. The answer, therefore is to cut cost. "If we all resolve to strive for low cost, we can get it."

WHAT'S A NON-GASSY MINE?

Though expressing himself as doubtful that the final answer has been reached, Mr. Westfield, in the address of the evening at the institute dinner, with Dr. W. P. Allyn, Indiana State Teachers College, as toastmaster, offered the following conclusion upon completing a discussion of safety in general and gas in particular:

"The best definition I can offer for a non-gassy mine would be a mine where a methane explosion would be impossible."

In developing his theme, Mr. Westfield noted that coal has come a long way not only in safety but in all other directions—not because of the efforts of outside agencies but through the labors of men, supervisors and management. Legislation is a necessary factor in safety but there can be too much. The fact that more legislation is proposed reflects in part at least the failure of the industry at a certain point to do the job it knows how to do. It has the ingenuity and the know-how, if it will apply them, to get results in safety as in all other things.

Coal has a part in coming up with the answer to what is a gaseous mine. In reaching this answer, it should be kept in mind that all operations should be considered as potentially gassy, since ex-

perience proves that it cannot be said that gas will never occur. This brings up a problem that cannot be answered by legislation and regulations. Rather, the industry must find the answer itself.

Adopting the definition that a nongassy mine is one in which a methane explosion would be impossible brings serious economic implications, but, Mr. Westfield pointed out, "it sounds logical to me. I believe that the 0.05% in open workings in old Safety Board Decision No. 3 combined with some modification of the borehole sampling method provides the best approach to this problem. However, this is as much your problem as it is mine, and I leave it with you."

PERSONALS . . . from p 149

Eastern Gas & Fuel Associates, Coal Div., Mt. Hope, W. Va., has announced the retirements of: **John C. Deaner,** section foreman, Federal No. 1 mine; **Marshall F. Leeper,** safety inspector, Maitland mine; **Robert M. Mann,** section foreman, Keystone mine; **Shirley Mayes,** safety inspector, Powellton No. 3 mine; **John C. Newman,** power house engineer, and **Edward R. Shaw,** division shipping clerk, both at Kimball offices; **Philip P. Reece,** safety inspector, accident prevention department, Mt. Hope; and **Clarence E. Zuspan,** chief electrician, Federal No. 1 mine, all in West Virginia.

Van E. Austin, who has served as mine manager at the Freeburn mine operated by the Freeman Coal Mining Corp., Marion, Ill., has been named assistant to the president of that corporation May 15.

Wesley I. Heer, associated with General Electric Co. in its engineering division since 1941, has been appointed electrical engineer of the Philadelphia & Reading Coal & Iron Co., Pottsville, Pa. Mr. Heer succeeds the late **Albert Brown.**

Henry A. Dierks, vice president and general manager, Glen Alden Coal Co., Wilkes-Barre, Pa., resigned Aug. 1, as a result of a serious eye ailment with which he was stricken on May 24. With Glen Alden since Nov. 1943, he became vice president and general manager Jan. 1, 1948. In tendering his resignation, Mr. Dierks said that inability to resume his work at any foreseeable time prompted his decision to retire.

William H. Barrett, executive assistant to the president, The Lorain Coal & Dock Co. and The Lorado Coal Mining Co., Columbus, Ohio, has announced his resignation. **Stanley B. Johnson Jr.,** assistant to the president, will succeed Mr. Barrett, and **Frank A. Burke,** director of sales, will succeed Mr. Johnson. Mr. Barrett has been associated with the companies since 1945. Mr. Johnson started working at Lorado in 1938.

R. L. Sutherland, in charge of lignite operations at Truax-Traer Coal Co., Kayford, W. Va., left recently for Ankara, Turkey, where he will assist that country in the production and utilization of its lignitic coals. He will return to Truax-

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For Thick Seams: No 86A is 20" high and will lift 5 tons 13". Most mines use it for rerailing, moving and adjusting machines, conveyors, etc.

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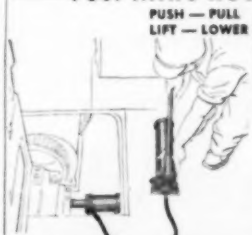
For Thin Seams: No. 84A is 14" high, lifts 5 tons 7" and weighs only 28 lbs. Has all the famous Simplex safety features.

Test Mine Roof Bolts and 100 Other Jobs



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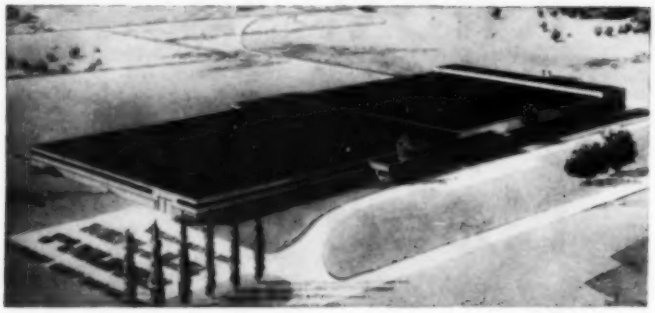
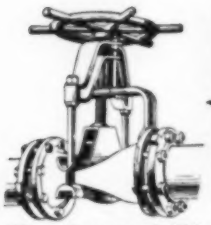


THIS MULTIMILLION - DOLLAR PLANT to be built by Westinghouse Electric Corp. at Vicksburg, Miss., reportedly will be the largest plant in the nation to be devoted exclusivly to the manufacture of industrial incandescent and industrial and commercial fluorescent fixtures. Planned for completion in about a year, the one-story steel and brick structure on a 55-acre site will feature the latest in plant design and mechanized equipment. In commenting, Burt S. Burke, manager of the Westinghouse Lighting Div., pointed out that the history of the lighting equipment business has shown that volume has doubled roughly every 10 yr and that there is every indication that this growth will continue.

Traer when his assignment for the Mutual Security Administration is completed in three or four months.

R. L. McMurtrie has been appointed chief of the lignite branch of the Region V Fuels Technology Division, and superintendent of the Charles R. Robertson Lignite Research Laboratory, U. S. Bureau of Mines, Grand Forks, N. D. Prior to receiving his M.S. and Sc.D. degrees in chemical engineering at the Massachusetts Institute of Technology, Mr. McMurtrie served with the Army overseas in France and Austria.



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Recesses molded into sides of sleeve act as "hinges" during compression, eliminating excessive strain and wear. These valves have been used successfuly for many years by various industries, wherever there is a problem of transporting abrasive or corrosive pulps or liquids. Here are some of the other proved advantages of these valves:

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- **Only ONE Wearing Part**
- **Withstands All Chemicals Not Harmful to Rubber or Neoprene**
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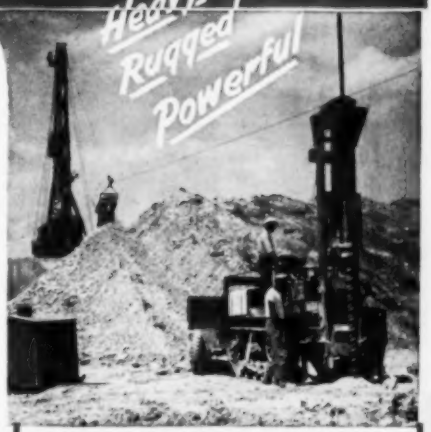

McCarthy truck-mounted Horizontal Drills keep men and equipment off of the ground, up out of the mud. All McCarthy units are adjustable to necessary drilling angles. Finger-tip controls and six-foot interlocking auger sections provide unlimited drilling opportunity. Self-propelled models also available.

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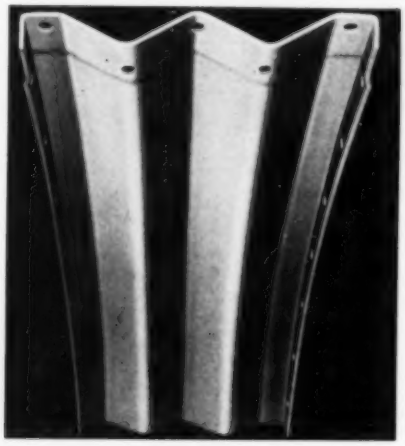

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Armco Liner Plates

ARMCO

Charles L. O'Brien was recently promoted to superintendent, Indianola mine, Republic Steel Corp., Indianola, Pa., according to an announcement by J. H. Reitz, manager, Northern Coal Mines District, Republic. A veteran of 28 yr in mine supervision, Mr. O'Brien joined Republic in Sept., 1940, as assistant mine foreman. Earlier this year Mr. O'Brien received a certificate of honor from the Joseph A. Holmes Safety Association for supervising a crew of 28 men for 1,087 consecutive days (339,868 man hours) without a lost-time injury.

Preparation Facilities

Eastern Gas & Fuel Associates—Contract closed with Kanawha Mfg. Co., Charleston, W. Va., for one Jeffrey 3-compartment Baum-type jig for cleaning 300 tph of 7x¾.

Stephens Elkhorn Fuel Co., Manton, Ky.—Contract closed with Jeffrey Mfg. Co. for a single-compartment diaphragm jig for cleaning 6x¾ at a rate of 150 tph.

Reitz Coal Co., Mine No. 4, Central City, Pa.—Contract closed with Fairmont Machinery Co. for erection of an addition to the existing plant including a Chance cone cleaning 100 tph of 5x⅜; dewatering and sizing screens to split the 5x⅜ into 5x2, 2x¾ and ¾x⅜, and a water-clarification system equipped with a Dorr thickener and a Bird polisher.

Mitsubishi Mining Co., Mitsubishi-Kogayama mine.—Arrangements made with Southwestern Engineering Co. for use of drawings, specifications and operating instructions for a 100-tph heavy-media plant to be built in Japan from Southwestern's plans by Yokoyama Engineering Co., Tokyo.

Consolidation Coal Co. (W. Va.), Williams mine, Stringer, W. Va.—Contract closed with Deister Concentrator Co. for 16 No. 7 SuperDuty Diagonal-Deck coal-washing tables for cleaning ⅜x0, and for three Concenco Model 108-B revolving feed distributors.

New Black Diamond Coal Co., Marion, Ill.—Contract closed with Deister Concentrator Co. for two SuperDuty Diagonal-Deck No. 7 tables cleaning 1¼x⅛-in stoker coal.

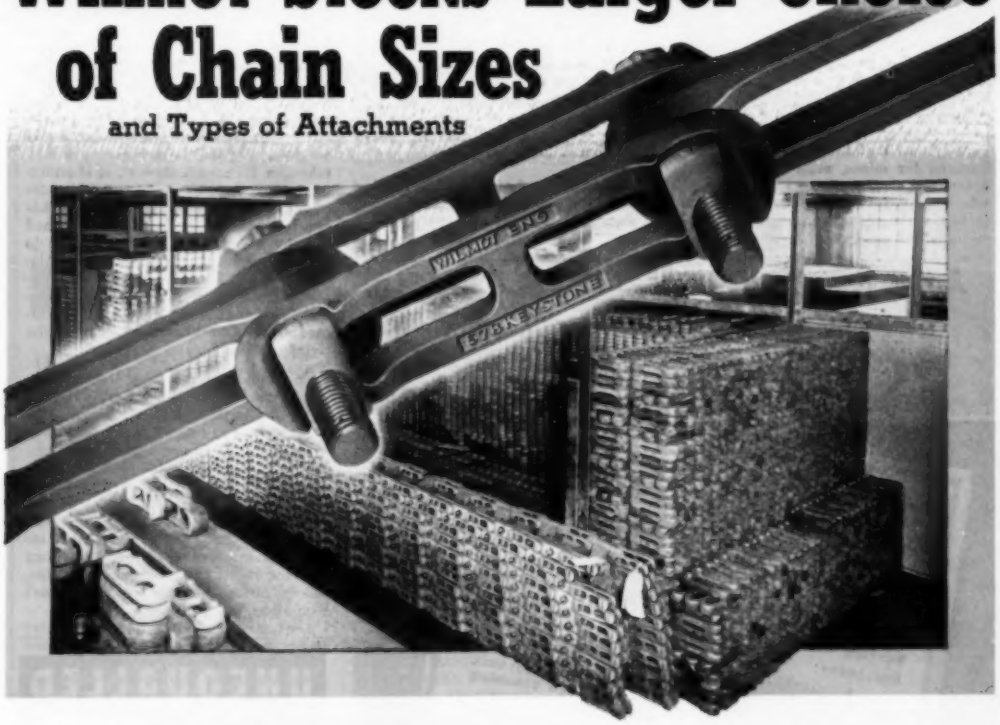
Locust Valley Coal Co., Leesport, Pa.—Contract closed with Deister Concentrator Co. for four No. 7 SuperDuty Diagonal-Deck tables cleaning No. 4 anthracite.

Bellingham Coal Mines, Inc., Bellingham, Wash.—Contract closed with Deister Concentrator Co. for two No. 7 SuperDuty Diagonal-Deck tables for cleaning 3/16x0.

Dawson Daylight Coal Co., Dawson Springs, Ky.—Contract closed with Deister Concentrator Co. for three heavy-duty Leahy vibrating screens with Flex-Elex arrangement for heating the screen cloth.

Wilmot Stocks Larger Choice of Chain Sizes

and Types of Attachments



WILMOT HAS EVERYTHING FOR RIVETLESS CHAIN CONVEYORS

Because Wilmot furnishes a more complete choice of rivetless chain conveyor parts, an increasing number of leading firms are depending on Wilmot for all their replacements. As the originators of rivetless chain, Wilmot stocks the largest choice of chain sizes and attachments:-- Chain in pitches from 3" to 10½" and working loads from 3,000 to 130,000 lbs.; of drop-forged steel, alloy or cast chrome-manganese steels. We also furnish sprockets, traction wheels, flights, take-ups, shafting, bearings and trough in cast iron, ductile iron, carbon or chrome-manganese steel to fit your application. See how Wilmot's wealth of engineering and production know-how can help solve your design and delivery problems.

WILMOT REPRESENTATIVES

BIRMINGHAM 4, ALA. -- Amos A. Culp, 930 Second Avenue, North

CHARLESTON 23, W. VA. -- Cross Pump & Equipment Co., P. O. Box 889

HAZLETON, PA. -- Wilmot Engineering Co., Markle Bank Building

HONOLULU 6, H. I. -- P. S. Pell & Co., Ltd., 88 S. Queen St.

KNOXVILLE, TENN. -- Crowell Engineering & Sales Co., 3045 Sutherland Ave.

PITTSBURGH 16, PA. -- Harold C. Lusk, 3045 West Liberty Avenue

ST. LOUIS 5, MO. -- Jack Van Horn, 7543 Cromwell Drive

NEW YORK 38, N. Y. -- International Manufacturing & Equipment Co. (export only), 220 Broadway

Send for BULLETIN C-502

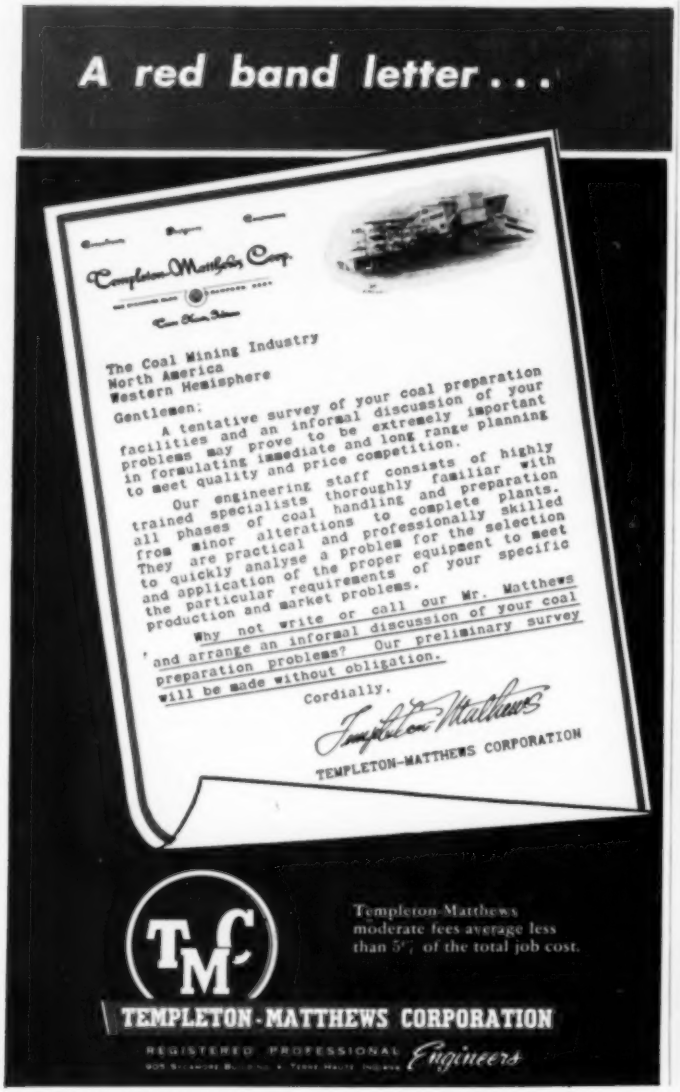
WILMOT ENGINEERING CO. HAZLETON, PA. Plant: WHITE HAVEN, PA.

Among the Manufacturers

The majority stock of the Mosebach Electric & Supply Co., Pittsburgh, has been acquired by Ray Hampton and L. H. "Jiggs" Hampton. Mrs. Karl J. Mosebach, co-founder of the firm, has resigned as treasurer and chairman of the board after 27 yr of service. The company is now expanding the items manufactured for mines, mills and railroads, according to Ray Hampton, president, who reported that "our new products include various types of signal rail bonds, resistors and associated electrical items." Mr. Hampton stated, "It is our aim to carry out the policies established by our founder, the late Karl J. Mosebach." The company's nationwide sales staff also has been greatly increased, with new representatives recently appointed in various cities and an enlargement of its Pittsburgh home sales force.

Templeton, Kenly & Co., Chicago, has made various changes in its sales staff in a step expected to improve customer service. Phillip H. McManus, formerly general sales manager, has been elected vice president in charge of sales. In addition to directing sales, Mr. McManus will travel in the far western territory. A new addition to the staff, William H. Zepp, will assist Mr. McManus in the states of Illinois, Indiana, Iowa, Kansas, Michigan, Missouri and Wisconsin. N. L. Montgomery has been appointed manager of mining sales in the territory including Southern Indiana, Southern Ohio, Kentucky, Pennsylvania, West Virginia and Virginia. He will be assisted by a new salesman, Richard S. Bowers, of Huntington, W. Va. William D. Boldt, southeastern division sales manager, with headquarters in Atlanta, has been assigned the states of Arkansas and Louisiana in addition to his former territory of Alabama, Georgia, Florida, Mississippi, Tennessee, North Carolina, and South Carolina. Arthur C. Templeton, whose headquarters are in Dallas, will cover the states of Oklahoma and Texas.

Entry into the compressed-air mining-equipment field by the Equitable Powder Mfg. Co., an Olin affiliate, through the acquisition of an interest in the Armstrong Coalbreak Co., Benton Harbor, Mich., has been announced by John M. Olin, president of Olin Industries, Inc. Armstrong holds basic patents and sells and services equipment for the compressed-air coal-shooting technique. The exclusive sales and service of Armstrong compressors, interconnecting air lines, and "shells" will be carried on by Olin's Explosives Div.


A red band letter . . .
Templeton-Matthews Corp
The Coal Mining Industry
North America
Western Hemisphere
Gentlemen:
A tentative survey of your coal preparation facilities and an informal discussion of your problems may prove to be extremely important in formulating immediate and long range planning to meet quality and price competition.
Our engineering staff consists of highly trained specialists thoroughly familiar with all phases of coal handling and preparation from minor alterations to complete plants. They are practical and professionally skilled to quickly analyse a problem for the selection and application of the proper equipment to meet the particular requirements of your specific production and market problems.
Why not write or call our Mr. Matthews and arrange an informal discussion of your preparation problems? Our preliminary survey will be made without obligation.
Cordially.
TEMPLETON-MATTHEWS CORPORATION
Templeton-Matthews moderate fees average less than 5% of the total job cost.
TEMPLETON-MATTHEWS CORPORATION
REGISTERED PROFESSIONAL Engineers

Save

BIG MONEY

ON BABBITT AND IMPROVE YOUR SERVICE RECORD

by using

PROMET XXX

Long Service

LEAD BASE BABBITT

instead of scarce, costly tin base babbitt.

This fine, velvety grain babbitt metal is made entirely from pure virgin metals, perfectly alloyed and heat treated to withstand tremendous loads at high speeds and elevated temperatures that would be dangerous with other babbitts.

Tensile	10,000
Elong	5.5%
Compress. Strength	10,000

Promet XXX will not score, cut or powder even in lubrication failures. The coefficient of friction is considerably less than that of tin babbitts, thus reducing power loss and wear. The entire bearing surface wears uniformly, without pitting.

Simply heat to 900°—1000° F. and pour. Can be heated to 2000° F. without burning or injury. Repouring only refines it. There is no appreciable shrinkage, hence a better contact with supporting shell, a more solid, rigid bearing.

Promet XXX has been proven ideal for use in blowers, cement mills, clay working machines, compressors, conveyors, crushing machinery, diesel engines, dredges, fans, machine tools, mining machinery, motors and generators, paper mills, pumps, rock and gravel plants, saws, steel mill bearings and sugar mills.

Supplied in 10 lb. pigs.

IMMEDIATE DELIVERY

Write today for service data sheets and quotations.

THE AMERICAN CRUCIBLE PRODUCTS COMPANY

1307 Oberlin Avenue
Lorain, Ohio, U.S.A.

D. G. Clark has been appointed assistant general sales manager, Firth Sterling, Inc., Pittsburgh. Mr. Clark joined Firth Sterling in 1903 and from 1935 until 1946 served as vice president in charge of sales. In 1946 he retired from active management, but remained as consultant on sales until 1950, when he was appointed steel sales manager. E. William Kalb, formerly assistant manager of the steel sales division, has been appointed steel sales manager to succeed Mr. Clark. Mr. Kalb's 14 yr of experience in the steel industry has covered tool-steel, stainless and alloy-steel specialties.

Link-Belt Co., Chicago, has appointed Robert W. Suman chief engineer for its new Colmar, Pa., plant and Norman Virkler to succeed Mr. Suman as chief engineer for the Philadelphia plant. Mr. Suman joined Link-Belt in 1934, becoming chief engineer for power-transmission products at Philadelphia in 1946 and chief engineer for the past year. Mr. Virkler has been associated with the Link-Belt Philadelphia plant for almost 35 yr, and since 1946 has been in charge of all enclosed-drive development work.

Weaver E. Falberg, assistant manager of alloy-steel division of Joseph T. Ryerson & Son, Inc., Chicago, has been appointed manager of the division. Mr. Falberg, who started with Ryerson in 1936 and has held various posts, relieves John W. Queen, who has been given special administrative duties while awaiting reassignment in the organization.

Robert C. Carruthers has been appointed assistant sales manager, welding products, American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill. Mr. Carruthers joined American Brake Shoe in 1950 as metallurgical assistant and previously was sales development engineer with the division.

Euclid Road Machinery Co., Cleveland, has appointd Butler-Sparks Equipment Co., Oklahoma City, distributors for the state of Oklahoma. E. A. Butler is president, and R. A. Sparks sales manager of the firm, which has a branch in Tulsa headed by C. J. White.

The Tractor Div. of Allis-Chalmers Mfg. Co. has awarded contracts for construction of a new modern one-story fireproof building to house its Kansas City branch. The new building, to be located on 12 acres of land 2 mi south of Independence, Mo., will be a brick and concrete structure with a machinery storage area of approximately 27,000 sq ft. The parts department will utilize 23,000 sq ft and the office about 10,000 sq ft. The building has been specially designed to facilitate storage and expedite repair parts and machinery movement to dealers in Kansas, Missouri and Arkansas for increased customer service.

Harnischfeger Corp. has officially opened its new diesel-engine division in Crystal Lake, Ill., bringing to nine the number of P&H plants now in operation. The many guests attending the cornerstone-laying ceremony heard talks by Karl P. Schoeppner, general manager of

The E. K. Campbell Co.

Specialists

in HEATING MINE BUILDINGS

- On new structures, we integrate system design with building needs for maximum protection at minimum cost.
- On existing structures, we offer free engineering survey service.
- E. K. Campbell Furnace Fan System is available at low initial cost.
- No water used.
- Guaranteed protection against freeze-ups.
- Cuts maintenance and operating costs.

E. K. Campbell Co.
LARGE SPACE HEATING EQUIPT.
K.C., Mo.

for

- TIPPLES
- GARAGES
- WASHERY
- WAREHOUSES
- REPAIR SHOPS
- ETC.

The E. K. Campbell Company
Manchester at 18th
Kansas City 3, Missouri

Please send bulletin "FF-491"

Building
Size_____ Type_____

Name_____

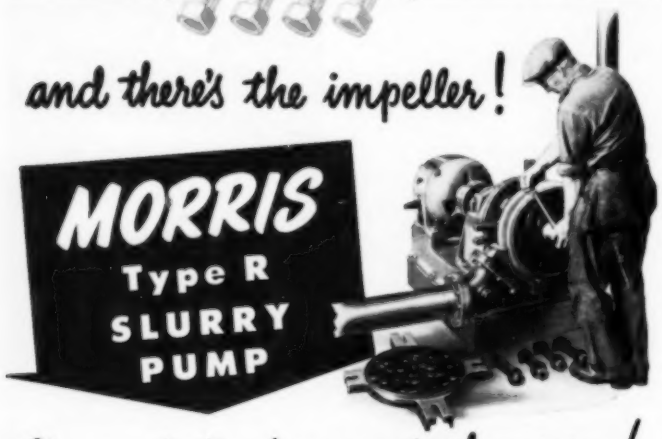
Company_____

Address_____

City_____ State_____

Remove 4 Bolts . . .

and there's the impeller!



No need to disconnect the piping!

Morris Type R is the slurry pump whose impeller can be removed without disturbing the suction and discharge piping or the bearings! To get at the impeller and renewable shaft sleeve, you simply loosen four outside clamping bolts — slip them out of disc slots — take off the end cover. Impeller unscrews from shaft threads; shaft sleeve is removed through end cover opening.

At no point do you have to dismantle the piping. Lay-up time costs are less . . . pump is back in service quicker.

Use the Morris Type R in Your Coal Mining Operations

Morris Type R is the product of 88 years' experience in designing and building materials-handling pumps. It is specifically engineered to handle mixtures containing abrasive solids, acid slurries and sludges, refuse, etc.

Write for specifications, capacities, performance charts, and other helpful information. Ask for Bulletin 181.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS *Centrifugal Pumps*

the diesel-engine division; Walter Harnischfeger, president; Henry Harnischfeger, executive vice president; and Fred Salditt, vice president. The new one-story building occupies over 100,000 sq ft on an 80-acre tract of land and houses both the plant and general offices of the diivsion. Following the ceremonies, an open house was held for employees, friends and neighbors, with approximately 6,000 people attending.

S. C. Leyland, Bloomfield, N. J., has been named manager of engineering, Westinghouse Meter Div., it has been announced by James M. Wallace, division manager. A graduate of Worcester Polytechnic Institute in 1924, and with Westinghouse since 1925, Mr. Leyland will be responsible for the design of all products of the division, including watt-hour meters, relays, instruments and auxiliary equipment.

Reliance Electric & Engineering Co., Cleveland, announces the appointment of four engineers to new posts at its Cleveland, New York, Buffalo and Chicago district sales offices, as follows: James M. Biggar, Cleveland; Burton B. Finigan, New York; Walter A. Jensen, Buffalo, and William C. Prettyman, Chicago. Creation of the new posts broadens the scope and availability of the company's technical sales and applied engineering services to Reliance customers, E. E. Helm. vice president—sales, said.

R. S. Stevenson has been elected executive vice president of the Allis-Chalmers Mfg. Co., Milwaukee, Wis. With the company for 19 yr, Mr. Stevenson was named general sales manager of the tractor division in 1950 and vice president in charge of the tractor division in 1951. Willis G. Scholl, formerly vice president and sales manager of the division, was named to succeed Mr. Stevenson. Frank Mussell, eastern territory manager of the tractor division succeeds Mr. Scholl.

Morris Machine Works, Baldwinsville, N. Y., manufacturers of solids-handling pumps, announces that W. H. Pfarren, vice president — sales and engineering, now is located at the company's Chicago office, 211 West Wacker Drive. Mr. Pfarrer will assume the duties formerly managed by the late F. S. Salchenberger.

Westinghouse Electric Corp. has appointed Kenneth L. Horgan eastern district manager of the industrial division to succeed J. S. Parry, Jr., who has been transferred to E. Pittsburgh, Pa., as assistant manager of the company's apparatus division.

New Books for Coal Men

Blasting Coal Underground

Experiments on Multiple Short-Delay Blasting of Coal, Part II, by John Nagy, Irving Hartmann, F. P. Christofel and E. C. Seiler. This follows an earlier study (USBM, R. I. 4868, March, 1952) and throws more light on single, short-delay and simultaneous blasting with permis-

sible and non-permissible explosives. The new report lists factors affecting ignition of gas and dust, tells results of various types of shooting and makes suggestions for minimizing misfires. *USBM, R. I. 4875. 22 pp. 8 x 10½ in; paper; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Mining for Practical Men

Elements of Practical Coal Mining. This 17-chapter book was prepared by practical coal-mining men under the sponsorship of the Kentucky Mining Institute and the Mayo State Vocational School, Paintsville, Ky. The language is simple and straightforward. The volume is written for men without formal technical training and for students who will earn their living in coal mines. It puts an understanding of highly technical operations within the grasp of everyone. Chapters and their authors are as follows: geology, D. J. Jones; utilization, H. J. Carswell; gases, A. D. Sisk; ventilation, J. H. Mosgrove and L. W. Huber; drainage and pumping, J. K. Berry; timbering, J. H. Winning; explosives, H. J. Phemister; Cardox and Airdox, F. J. Bailey; transportation, J. K. Berry; mining electricity, F. J. Forsyth; fires and explosions, Earl R. Maize; preparation, J. E. Glover; modern methods, E. A. Starling and Arthur Bradbury; first aid, G. E. Reid; coal chemistry, W. H. Roll; safety, H. C. Elkins; and occupational opportunities, M. D. Cooper. *436 pp. 6¼ x 9¼-in; boards. Fewer than 12 copies $4.50 each; 12 or more, $4 each. Mayo-KMI Coal Mining Book, J. A. Patton, sec.-treas., Paintsville, Ky.*

Association Activities

The Anthracite Section, AIME, at its recent summer meeting at Split Rock Lodge, Lake Harmony, Pa., elected John M. Reid, general manager, The Hudson Coal Co., Scranton, to the position of section chairman to succeed D. C. Helms, vice president, Lehigh Navigation Coal Co., Lansford. E. G. Fox, president, Philadelphia & Reading Coal & Iron Co., Philadelphia, was named vice chairman, and Floyd S. Sanders, district manager, Goodman Mfg. Co., Wilkes-Barre, was reelected secretary-treasurer. The following were named to the executive committee: 1-yr terms; W. W. Everett, Glen Alden Coal Co.; George J. Clark, Philadelphia & Reading; E. T. Powell, Susquehanna Colliery Div., The M. A. Hanna Co.; J. H. Pierce, Pierce Management, Inc.; W. C. Muehlhof, P&R; 2-yr terms, Adrian E. Ross, Sprague & Henwood; K. F. Arbogast, Lehigh Valley Coal Co.; Joseph Crane, Locust Coal Co.; John T. Griffiths, Hudson Coal Co.; A. E. Dick, Jr., Dick Construction Co.; 3-yr terms, Ralph Lambert, Pennsylvania Coal Co.; F. Edgar Kudlich, Glen Alden; John W. Buch, U. S. Bureau of Mines; Francis Sterner, Lehigh Navigation Coal Co.; and Wilmot Jones, Jeddo-Highland Coal Co.

Central Pennsylvania Safety Association June 17 elected George Resick, state

800,000 TONS

without replacement

In the preparation plant at New Lexington, Ohio, of the Sunnyhill Coal Company, a Hendrick Flanged Lip Screen handled over 800,000 tons of coal in a 28-month period, and was still in good condition with slots free from blinding and corrosion.

Made of 12-gauge stainless steel, with ⅛" x 3/16" x ¾" slots, this Flanged Lip Screen forms a 7' x 24' bottom deck of a three-deck shaker, dewatering and sizing wet coal to ¼" x 0. Operating conditions are severe, 8,000 gallons of water a minute passing through the shaker. With the type of screen used previously, continuous operation was not possible because of blinding.

To meet varying requirements, Hendrick Flanged Lip Screens are made in 150 standard sizes of slots of small, medium and long types. Write for full information.

See our catalog in Sweet's

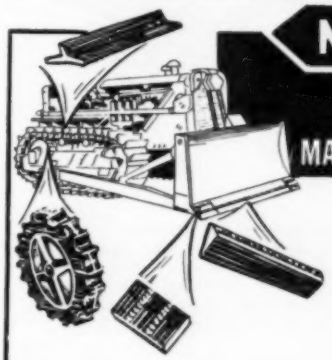
HENDRICK

Manufacturing Company

41 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids



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U.S. PATS. 1,976,738—1,947,167—2,021,945

11% - 13½% MANGANESE-NICKEL STEEL

KEEPS YOUR BULLDOZERS PRODUCING LONGER!

1. MANGANAL SPECIAL SHAPE APPLICATOR BARS replace worn edge of tractor blade and tractor grousers faster — more economically.
2. MANGANAL BARE ELECTRODES reclaim drive sprockets, track rollers and idler wheels over and over again.
3. MANGANAL FLAT APPLICATOR BARS rebuild worn corner bits for longer life.

MANGANAL — the toughest metal known — usually outlasts new parts.

FREE

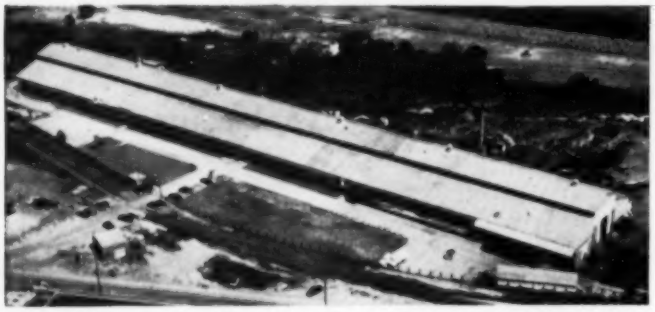
Literature on the latest methods for speedy and economical repair of worn equipment.

Name of nearest distributor on request.

STULZ-SICKLES CO.

SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.

Koehring Organizes New Subsidiary



IN A MOVE to increase facilities for development and manufacture of new models of its power shovels and cranes, Koehring Co., Milwaukee, has organized another subsidiary company, known as Koehring Southern Co., and has purchased the Chattanooga, Tenn., plant of the Norge Div. of Borge-Warner Corp. Acquired for about $500,000, the new plant provides 100,000 sq ft of floor space on a 17-acre site. The company plans to spend another $1 million for machine tools needed for new-product manufacture by the time it begins production early next year. The new facility will not affect present manufacturing schedules at the company's main Milwaukee plant.

mine inspector, 15th bituminous district, secretary of the association to fill the unexpired term of Sheldon Jones.

Stoker Manufacturers' Association at its recent 35th annual convention elected officers as follows: president—L. C. Dubs, Canton Stoker Corp., Canton, Ohio; vice president—B. O. Fink, Auburn Foundry, Inc., Auburn, Ind.; secretary-treasurer—Howard B. Scoville, Cotta Transmission Co., Rockford, Ill.; executive secretary—Marc G. Bluth, Chicago.

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Joy Mfg. Co.—Types 10SC-1PE/F and 10SC-PXE/F cable-reel shuttle cars; three 10-hp and two 5-hp motors, 250 and 500 v, DC; Approvals 2-863 and 2-863A; June 3.

Joy Mfg. Co.—Type RBD10 roof-bolting drill; one 10-hp motor, 250 and 500 v, DC; Approvals 2-864 and 2-864A; June 16.

Joy Mfg. Co.—Type CD31 drilling machine; one 26-hp motor, DC; Approval 2-865; June 20.

General Electric Co.—Type LSBE-2C10K2 battery locomotive; Approval 1545; June 11.

SIGNS IDENTIFY!

...SCHOLASTIC ACHIEVEMENT

AUTHORIZED AIRCO DEALER

ONE call
ONE order
ONE invoice
For every welding and cutting need!

TAKE HARDFACING ALLOYS, FOR INSTANCE . . . Your authorized Airco dealer handles more than twenty types of hardfacing rods — to combat abrasion . . . impact . . . heat . . . corrosion. Every type of wear problem! He can show you how one application may add 2 to 25 times longer service life to new or worn parts.

Every item is backed by AIRCO's reputation . . . and delivered promptly to your door!

Whether you want to buy . . . or simply seek information, check your Airco dealer first! Consult your classified phone directory (under Welding Equipment and Supplies) . . . look for this famous sign.

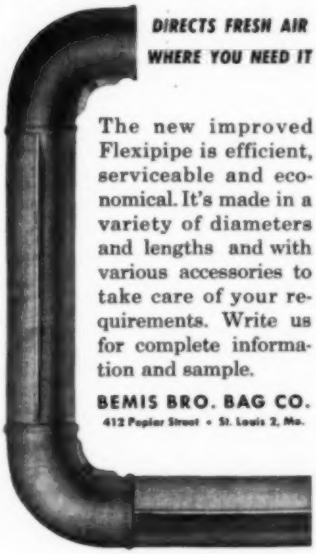
AUTHORIZED AIRCO DEALER

AIR REDUCTION

AIR REDUCTION SALES COMPANY · AIR REDUCTION MAGNOLIA COMPANY
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
Offices in Principal Cities

AT THE FRONTIERS OF PROGRESS YOU'LL FIND

USE FLEXIPIPE®
. . . the quality ventilating tubing



DIRECTS FRESH AIR WHERE YOU NEED IT

The new improved Flexipipe is efficient, serviceable and economical. It's made in a variety of diameters and lengths and with various accessories to take care of your requirements. Write us for complete information and sample.

BEMIS BRO. BAG CO.
412 Poplar Street • St. Louis 2, Mo.

CONTROLLED TIMER

at a price you can afford

PRE-SET, TAMPER-PROOF TIMING

Practically non-breakable, Durakool Pre-set Timer Relays have more than proved themselves on the roughest and toughest jobs that could be found. Year by year, their use increases in sensational fashion. Controlled time available from .15 to 20.0 seconds in either normally open or normally closed actions. 3 to 4 week delivery. No waiting. Your production schedule is met.

- ★ No false contacts
- ★ No chatter
- ★ Quiet in operation
- ★ Eliminates double contacting or breaking of circuit

See telephone directory for local distributor or write

DURAKOOL, INC., Elkhart, Ind.

Durakool

ALL-STEEL MERCURY *Timers*

COMING MEETINGS

Mining Electrical Group: Annual Exhibit, Aug. 21-23, West Frankfort Country Club, West Frankfort, Ill.

National Safety Congress: 40th annual meeting, Oct. 20-24, Conrad Hilton, Congress, Morrison and Sheraton Hotels, Chicago, Ill.

Illinois Mining Institute: 60th annual meeting, Oct. 24, Hotel Abraham Lincoln, Springfield, Ill.

BRIEFS . . . *from p 148*

Jamison No. 21 Wins Meet

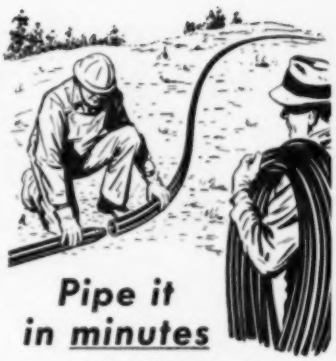
A score of 99.933 took first place for Captain John Yurkrenis and his team from Jamison No. 21 mine, Jamison Coal & Coke Co., Hostetter, Pa., at the Westmoreland County Safety Association contest at Latrobe, June 14. Other members of the team are John Labuda, John Cmar Jr., Paul Permuka, Peter P. Kmetz, James J. Murray and John Gratcar. Awards for the winners were $200 and the Mine Safety Appliances Co. plaque. Second place was won by the team representing Carpentertown Coal & Coke Co., Mt. Pleasant, headed by Louis Sibal, captain, and third place by McCullough mine, Westmoreland Coal Co., Claridge, under John Kelly, captain.

Honor First-Aid Progress

The 100% completion of the Bureau of Mines Accident-Prevention Course at the Oriole and Moss Hill mines of the Bell & Zoller Coal & Mining Co. was marked by a luncheon June 14. Speakers were J. J. Forbes, USBM director; W. H. Tomlinson, chief of the Bureau's Vincennes Branch; Jess Lovelace, secretary-treasurer, District 23, United Mine Workers; and L. H. Bell, secretary-treasurer, District 23. Oriole and Moss Hill thus become the first mines in western Kentucky to complete the course, which started at Moss Hill in March and was completed at Oriole in June. Since the termination of training, no lost-time accidents have occurred at either mine.

Industry Stimulates Election Interest

Bemis Bro. Bag Co., St. Louis, Mo., is promoting a new series of pictorial booklets dealing with the importance of the individual's vote, as part of its campaign to stimulate greater interest among Americans in the political and economic affairs of the nation. Backed up by Bemis advertising in news and business magazines, and by direct mail to business and civic organizations, the company is distributing booklets entitled, "The Man Who Wouldn't Quit," and "Your Vote Is Vital." The first booklet shows how one individual, or a small group, can be influential in obtaining good government. As a companion piece, the second booklet emphasizes the importance of registering and voting, of understanding the



Pipe it in minutes

to last for years!

PLASTEX PIPE

CORROSION PROOF Plastex Pipe won't rust, or rot and is unaffected by acids, alkalies, salts or other corrosive matter. Guaranteed safe for transmission of drinking water.

INCREASED FLOW up to 40% more than metal pipe due to rifle smooth plastic surface. Scale, paraffin or other sediment will not adhere to walls assuring maximum pipe efficiency.

EASY-TO-INSTALL with less labor, equipment and tools. Light weight cuts freight, handling and assembly costs. Continuous coils eliminate joints — can be put in operation in minutes.

SERVICE LIFE is far greater than ordinary pipe. Eliminates shut-downs, lowers maintenance costs.

Ask your supplier or write direct for specifications.

The PLASTEX Pipe and Extrusion Company
402 Mt. Vernon Ave. Columbus 3, Ohio

Light weight
Flexible

Guaranteed against Electrolytic Corrosion

Sizes from ½" through 6" and up to 400' long.

PLASTEX PIPE
CORROSION PROOF

THE OLE SWIMMIN' HOLE . . .
AIN'T WHAT IT USED TO BE

Do you have stream pollution problems too?
Investigate: THE PRINS "STREAMCLEANER"
K. PRINS AND ASSOCIATES
Engineers — Consultants — Designers
Affiliated: B-K INDUSTRIES, INC. WELLSTON, OHIO
Manufacturers of Coal Handling Equipment

Eliminate costly corrosion
... in mine piping systems

PLASTEX M
FLEXIBLE PIPE

We are now distributors of Plastex M — tough, durable flexible pipe manufactured by the Plastex Pipe and Extrusion Co. of Columbus, Ohio and primarily designed for mine drainage systems — provides long, trouble-free, corrosion-proof service. In restricted mine passages its light weight, flexibility, and ease of installation are time and labor-saving factors. Plastex M is also highly suitable for ventilation lines bringing in fresh air or carrying off gases and fumes. Write NOW for complete details and price information.

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issues involved, and of knowing the platforms and records of candidates. Both are in the "comic book" format and have been tested through distribution to 10,000 Bemis employees. Samples and price information may be obtained from Harvey Publications, Inc., Dept. B, 1860 Broadway, New York 23.

Safety Awards Presented

Outstanding safety records achieved by five mines of the Amherst Coal Co., Logan County, West Virginia, and one mine of the Hatfield-Campbells Creek Coal Co., Kanawha County, were honored at a Safety Awards Dinner at the Accoville (W. Va.) Boy Scouts' Camp June 20. The awards were made by J. T. Whalen, supervising inspector, Logan office, Mt. Hope Branch, U. S. Bureau of Mines, and were received by the following officials for the respective mines:

Point Lick No. 4, Hatfield-Campbells Creek, T. E. Mitchem, superintendent.

Amherst 1-B, Jess Trent, assistant superintendent, and Roy Castle, general mine foreman.

Lundale, W. T. Chaney, former superintendent.

Amherst 1-A, Russell Ward, general mine foreman.

Amherst 3-A, K. P. Marcum, general mine foreman.

Amherst 1 and 3, W. B. Hayes, superintendent.

Messrs. Hayes and Castle were awarded individual certificates, and the McGregor No. 2 operation was honored by the State of West Virginia for producing over 1,000,000 tons without a fatality. The award was made by H. P. Farley, member of the Safety Commission, Department of Mines, and was received by W. G. Beddow, superintendent.

Harry Gandy Jr., National Coal Association, presented 25 foremen with NCA certificates signifying the completion of 1 yr supervision without a lost-time injury to their men:

Amherst Coal Co.—Mose Chafin, Latrobe mine; Riley Watson, Lundale; John W. Nelson and Challis Workman, McGregor No. 1; Wayne Brumfield, Roy Copley, Thomas E. Johnson, Pat Jeffrey, and David Scalf, McGregor No. 6; Charles A. Cole, George A. Cooper and Damer Johnson, Paragon; James G. Blake, Amherst 1 and 3; Frank Barker, H. M. Burton and Clarence Sias, Amherst 1-A; Leonard Butcher and Clyde Gibson, Amherst 1-B; Frank Robinson and Bill Wilson, Amherst 1-C; Harvey B. Porter, Amherst No. 3; Guy V. Black, Amherst-Avon; and Gaither Knight, Amherst 3-A.

Hatfield-Campbells Creek Coal Co.—William Fitzsimmons and Chester Midkiff, Point Lick No. 4.

Power From the Atom

Progress in developing electric power from the atom was reported by two authorities in special addresses late in June. Technical know-how being developed in mobile power units for military purposes, said Norman L. Mochel, manager, metallurgical engineering, Westinghouse Electric Corp., in the Gillett Memorial Lecture before the Amer-

ican Society for Testing Materials, may make it economically possible to build plants primarily for the production of electricity from atomic energy.

Production of electric power from the atom is not far away, "although it is perhaps 4 or 5 yr away, measured in terms of full-scale producing units," declared Edwin J. Putzell Jr., secretary, Monsanto Chemical Co., St. Louis, in addressing the 5th Annual Summer Institute of the University of Michigan Law School. Mr. Putzell reported that Monsanto and the Union Electric Co. of Missouri had recommended design and construction of a pilot plant for a moderated type of atomic reactor. For the present, the reactor would also have to make plutonium. "Perhaps a decade or more of intensive research and development lies ahead before a reactor making only electricity becomes a reality."

Gordon Dean, chairman of the Atomic Energy Commission, on the other hand, expressed doubts earlier as to the likelihood of atoms competing with coal in the near future. "Atomic energy," he declared, "will tend to supplement, rather than supplant, our traditional sources of fuel supply, for at least as long as the traditional fuels are available at relatively low cost."

Comparative Fuel Prices Shown in New Book

Against a background of rising oil and natural-gas prices, the Coal Heating Service Div. of the National Coal Association announced a new book to help retail coal dealers in protecting their markets.

Entitled "Fuel Cost Surveys Help Retail Coal Sales," the new NCA book presents a detailed cost survey of 10 Michigan public schools.

And for Your Information . . .

A boost in the welfare-fund assessment from 30 to 50c per ton has been put forth as one of the demands by the Progressive Miners of America in this year's negotiations with Illinois operators holding contracts with the union.

An increase of 75c per ton for the smaller sizes of anthracite was requested of the Office of Price Stabilization June 30. The proposal was made by members of the Anthracite Industry Advisory Committee.

Coal-mining and distributing concerns —chiefly the former—obtained $12,420,000 from life-insurance companies and other investing institutions to add to plant, equipment and working capital in 1951, according to the "1952 Yearbook of Private Placement Financing," published June 30 by E. V. Hale & Co., Chicago.

Fireplace owners will be interested to know of a new anthracite-burning unit known as the "Anthra-Hearth," reports a recent issue of the "Dodson Weekly Bulletin," issued by Weston Dodson & Co. It is a compact and revolutionary grate that burns nut or pea, and is manufactured by the Anthracite Equipment Corp., Wilkes-Barre, Pa.

New and Better Diamond Bits for Modern High Speed Drilling

Always the leader in its field, Sprague and Henwood, Inc. has been working for a number of years on the development of new types of Diamond Bits, to supplement their well-known "TRUCAST" bits, which are still unsurpassed for many diamond drilling requirements.

NOW, after having been thoroughly proved by Sprague and Henwood's contract drilling crews, under every variety of drilling conditions, these new bits are available to other users. Two new types of "Powdered Metal" matrices; Improved "Cast Metal" matrices; "Impregnated" coring bits; a new faster-cutting "Taper" bit for drilling blast holes in very hard rock —are all illustrated, described and tabulated in a new 16-page bulletin, No. 320. Write for it today if you can use it to advantage.

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We do drilling by contract and we are one of the oldest and largest contractors for any type of core drilling. Experienced crews are available at all times for service anywhere in the world. Estimates submitted promptly on request.

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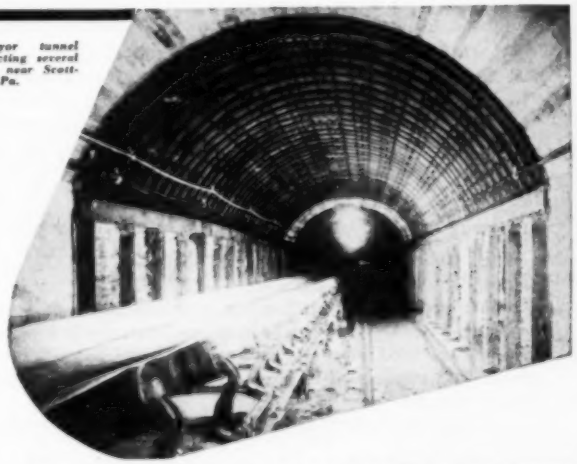
See our four-page insert in the Mining Catalogs



Conveyor tunnel connecting several mines near Scottdale, Pa.

for Permanency

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In main entries, like the one illustrated, steel liner plate with steel tunnel supports make this a dependable construction for year after year operation. Their quick and easy installation by unskilled labor makes this an ideal system for the varied conditions encountered in mines.
Consult a Commercial Engineer on your mine construction.

THE COMMERCIAL SHEARING AND STAMPING CO.
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With a dry-proofed cloth, fungus growths have less chance to start. Thus the cloth gives longer service, and can be re-hung. For added safety and economy, specify Upson-Walton when you need brattice cloth. Available in standard and heavy weights.

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with the confidence justified by the offering of these special services nationally.
Whose Cards Appear on This Page

Koppers Ar-Moored® Mine Ties

USE 'EM!
ABUSE 'EM!
RE-USE 'EM!

Koppers Ar-Moored Mine Ties in Working Section

ONE word describes these ties . . . TOUGH! Mine ties, that are lifted and re-laid, *have* to be tough to survive. Koppers Ar-Moored Ties can be re-laid repeatedly. One user reported he "quit keeping count" after he had re-laid his ties over fifty times.

A remarkable record—particularly when compared with ordinary ties. As a rule, ordinary ties are scrapped after being re-laid only four or five times. They soon bend out of shape or else succumb to "spike-kill."

Koppers Ar-Moored Mine Ties are made of steel *and* decay-resistant wood—thus combining, in one tie, the best features of each material. Oak bases are pressure-creosoted, pre-formed, pre-bored. Bethlehem Steel Mine Ties are fitted and secured to the tops of these treated wood bases. Ar-Moored Ties are assembled and shipped as a complete unit—ready for use on delivery.

Koppers Ar-Moored Switch and Cross Ties are ideal for temporary track in mechanized mines. They provide a stable, strong track with accurate gauge. They *maintain* rail alignment, thus decreasing danger of derailment. They can be re-laid easily and quickly as well as repeatedly.

It's safer, easier and much more economical to use Koppers Ar-Moored Ties. Our new book tells you why. Send for your copy.

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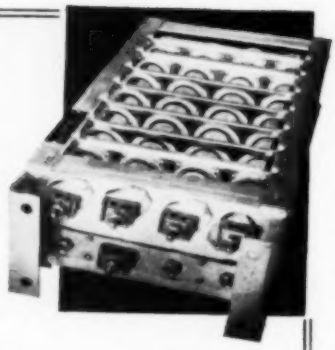
GUYAN RESISTORS *for* LOADERS



GUYAN Loader Resistors are built into a light but sturdy frame-work—have same ohmic resistances as specified by the loader manufacturer and have ample current capacity to prevent burn-outs. Designed to fit original mountings.

All terminals are easily accessible, plainly marked and conform with original wiring diagram.

★

For a complete range of quality, long life resistance products investigate the GUYAN line. Write today.

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GUYAN MACHINERY COMPANY

LOGAN, W. VA.

VISI-GARD

TROLLEY GUARD (Vinyl plastic)

★ Bright Yellow!! Tough!
★★ Shaped Right to Hang Right!
★★★ Will Not Support Flame!
For Sale Through Dealers

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. . . and clipped pertinent ideas, articles and advertisements for reference, *please do not burn or throw it away.*

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1) Wastepaper can help to swell the funds of your local Boy Scout Troop, your church or other community organization. It gets a good price these days.
2) Whether in magazine form or not, wastepaper helps to fill the increasing need for paper pulp brought on by the mobilization effort.

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1952 Coal Mine Directory Ready

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This detailed data includes names and addresses of companies, executives and mining officials as well as data on mine locations, seams, equipment (cleaning, mining, haulage) capacity, life expectancy, poduction. For the first time COAL MINE DIRECTORY indicates mines that are using roof bolting and rock dusting.

Every salesman and every executive whose responsibility includes sales to the coal industry should have a copy always available. For only $12.50 (or $6.00 for those who need data on limited geographical territories) CMD offers you a rather complete list of your prospects with detailed data concerning executives and mining officials who decide when and what to purchase, plus detailed data concerning type of mining, type of equipment, reserves and capacity that permit an accurate estimate of sales potentials.

Order from Coal Mine Directory, 330 West 42 Street, New York 36, New York.

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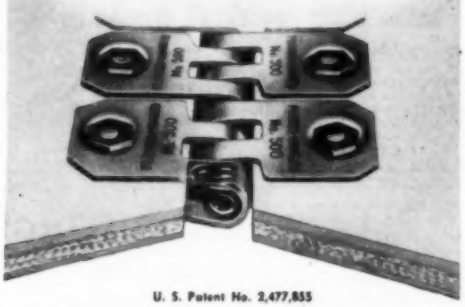

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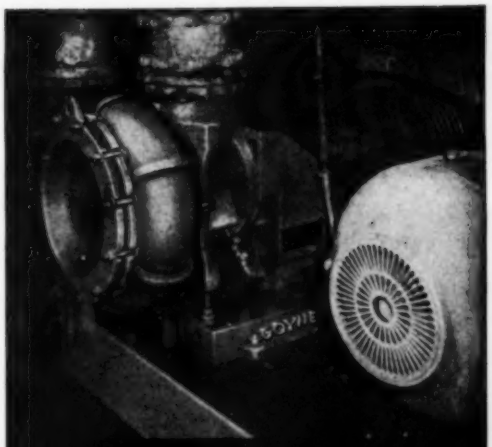

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Feature: LOW-COST OPERATION

GOYNE SOLIDS HANDLING PUMPS are extremely popular with a very large number of coal companies who find them quite reliable for pumping:

Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

Disposing of refuse and silt by pumping to waste material banks or for back filling into mined out areas.

Pumping prepared coal to temporarily desired storage areas.

These specially designed Goyne pumps incorporate numerous features to reduce upkeep and labor maintenance costs to a minimum:

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5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goyne Process Pumps.

All inquiries are given a thorough engineering analysis and our prompt attention.

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You can be sure of complete satisfaction when you come to Dart with your haulage problems. Here you will find a complete staff of competent engineers and a manufacturing plant to faithfully carry out their designs.

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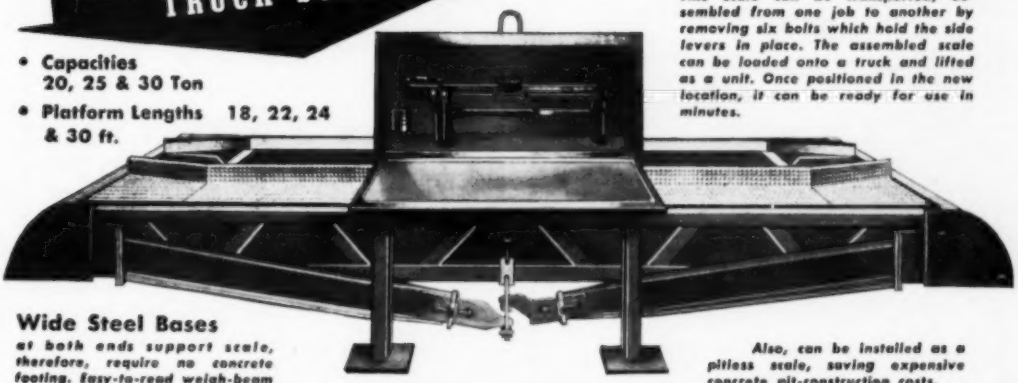

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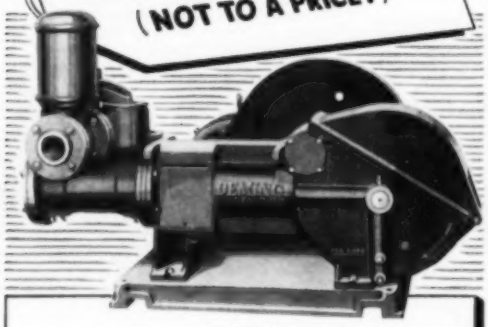

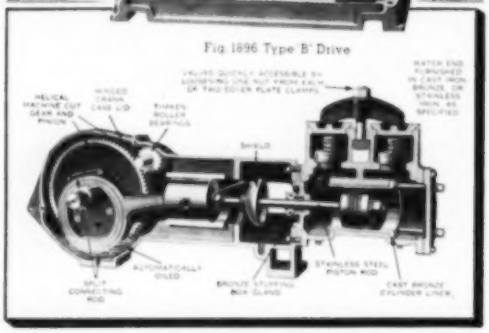

Fig. 1896 Type B Drive

Fig. 1896

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PERFORMANCE...not price...determines the economy of using these heavy duty, reciprocating power piston pumps in mine gathering service.

Timken tapered roller bearings on pinion shaft are adjustable to compensate for wear after long service. Stainless steel piston rod resists scoring and corrosion. Pinion of high carbon steel has machine-cut, helical teeth and is keyed to a ground and polished shaft of extra large diameter.

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NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for September issue. Closing August 19th

REPLIES (Box No.):
Address to office nearest you
NEW YORK: 330 W. 42 St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

Position Wanted

GRADUATE FORESTER, Age 33, married with children, service experience in mapping and aerial photogrammetry. 6 years in present position as Forester for large land and lumber company. Qualified for Land Management, sawmill and forest products operation, surveying and mapping. Detailed information and references on request. PW-4896, Coal Age.

Business Opportunities

Large Acreage for Stripping in Oak Creek, Colo. 12 ft., 14000 b t u, 4 miles haul. Small parting places pioneer work done. Marion Posig, Oak Creek, Colo.

Strip Coal Wanted

Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolia 8, Indiana.

585 acres strip coal

Railroad runs through this land putting it in a key position for other large leases. Mrs. Josie Warden, Centertown, Kentucky.

MOTOR GENERATORS

1—500 KW G.E. Syn. 275 V. 900 RPM
1—400 KW G.E. Syn. 575 V. 720 RPM
1—250 KW G.E. Syn. 275 V. 1200 RPM
2—300 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW RIDGWAY Syn. 275 V. 1200 RPM
1—200 KW G. E. Syn. 275 V. 1200 RPM
1—200 KW RIDGWAY Syn. 275 V. 900 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM
1—100 KW RIDGWAY Syn. 275 V. 1200 RPM

ROTARY CONVERTERS

1—500 KW G. E. Syn. 275 V. 1200 RPM
1—500 KW WEST. Syn. 275 V. 1200 RPM
1—300 KW G. E. Syn. 275 V. 1200 RPM
1—300 KW WEST. Syn. 275 V. 1200 RPM
2—300 KW Al-Ch. Syn. 725 V. 1200 RPM
1—200 KW G. E. Syn. 275 V. 1200 RPM
1—150 KW G. E. Syn. 275 V. 1200 RPM
1—150 KW WEST. Syn. 275 V. 1200 RPM

NEW G. E. RECTIFIER

1—200 KW G.E. Sealed Ignitron Rectifier, Mining Stationary Type, 2300/4000 V. AC, 275 V. DC. Complete with AC Switchgear Cubicle, Rectifier Cubicle and DC Switchgear Cubicle. Equipment is thrust connected to the main 235 KVA Rectifier Transformer. Rectifier Model 9SRP40CAA30. Complete with water and air heat exchangers. Power Transformer and all other necessary accessories. Unit has never been in service.

LOCOMOTIVES

2—30 T JEFFREY 250 V. 3-MH-77, 48-36" Ga.
1—25 T G.E. 500/250 V. 3-HM-824-A, 44-36" Ga.
1—20 T JEFFREY 250 V. MH-77, 48-36" Ga.
1—20 T G.E. 250 V. (Tandem) HM-809, 36" Ga.
1—13 T JEFFREY 250 V. MH-110, 48-36" Ga.
1—13 T JEFFREY 500 V. MH-110, 48-36" Ga.
1—10 T JEFFREY 250 V. MH-2119, 48-36" Ga.
2—10 T JEFFREY 250 V. MH-110, 42-36" Ga.
1—10 T WEST. 250 V. ML-907-C 36" Ga.
2—10 T GOODMAN 250 V. 38-B, 36" Ga.
2—8 T JEFFREY 250 V. MH-100, 42-36" Ga.
2—8 T WEST. 250 V. ML-906-C, 44-36" Ga.
1—8 T WEST. 250 V. ML-925-LK, 24" Ga.
2—6 T JEFFREY 250 V. MH-88, 44-36" Ga.
2—6 T JEFFREY 500 V. MH-88, 44-36" Ga.
2—4 T GOODMAN 250 V. MG-4-E, 36-24" Ga.

LOCOMOTIVE MOTORS

2—JEFFREY 250 V. MH-77, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
2—WEST. 250 V. ML-906-C, Ball Bearing
3—WEST. 250 V. ML-904-R, Ball Bearing
2—G.E. 500/250 V. HM-824-A, Ball Bearing
4—WEST. 80 V. V-49-X, Ball Bearing
Extra Armatures Available for Above Motors

WALLACE E. KIRK COMPANY
501 GRANT BUILDING PITTSBURGH 19, PENNSYLVANIA
A Quarter of a Century Serving Mining and Industrial Companies

Magneto* Telephones

Western Electric powerful 5 bar generator wall telephone with french handset on side.
Unit refinished, tested & ready to talk

PRICE $17.50

Bohnsack Equipment Co.
GERMANTOWN, NEW YORK

FOR SALE
New 500 Gal. Skid Mounted
STORAGE TANKS
Shell of ⅛" Steel, 2" Outlet and 12" Manhole in Top.
LEFTON INDUSTRIAL CORP.
212 Victor Street, St. Louis (4) Mo.

WANTED

BUYERS OF SURPLUS COPPER INSULATED WIRES AND CABLES
No lengths too long or too short
Telephone: Eastgate 7-4778
PIERCE CABLE CO.
2664 Clybourn Ave. Chicago 14, Illinois

—TRANSFORMERS—

BOUGHT AND SOLD
We carry a large stock of transformers, and invite your inquiries. New Transformers built to your specifications.

PIONEER TRANSFORMER REBUILDERS
We rewind, repair and redesign all makes and sizes.
One Year Guarantee.

THE ELECTRIC SERVICE CO., INC.
"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
SINCE 1912 CINCINNATI 27, OHIO

MOTOR GENERATOR SETS

750 KW Al.Ch. 250 v. 720R-Syn. 2300/440 v.
400 KW West., 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West., 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R. MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 500 v., 1200R-Syn.-SK 2300 v.
200 KW West. 275 v. 1200R-SK-CW 2300 v.
200 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900R-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
100 KW Burke 250 v. 900 R-Syn. 220 v.
50 KW G.E., 125/250 v. 1200R-MT-RC 220/440 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D.A 220/440 v.
10 KW Bardco 125 v 1750R. 220/440 v.

ROTARY CONVERTERS

500 KW West. 275 v. 1200 R. 2200/4000
400 KW West 250/125 v. 1200R. 13,800/2300/4000
2—300 KW Al.Ch. 275 v. 1200R. 2200/4000 v.
300 KW G.E. 275 v. WC12-500 R. 2200/4000
200 KW G.E. 275 v. HCCS-1200R. 2200/4000 v.
150 KW G.E. 275 v. HCCS-1200R. 2200/4000 v.
150 KW West. 275 v. 1200R. 2200/4000 v.

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 38/49" Ga. MH110
10 Ton Jeff 250 v. 38/49" MH110
8 Ton Goodman 250/500 v. 42"/44" ga.
6 Ton Westgh. 250 v. 30" Ga. 904
2—4 Ton G.E. 250 v. 29½" ga.
5 Ton Greensburg Mat. Loco.—Jeffries Mat.
4—6 Ton Goodman 30B 250 v. 42/44"
95 B Jeff. 250 v. Permissible
12 G3 Goodman Shortwall 220/3/60
135 BB Jeff. A.C. permissible
3—12A Gooman Shortwall 50HP Motor 230 v.

AC MOTORS

HP	MAKE	SPEED	TYPE	WDG.
400	G.E.	450	MT	S.R.
300	G.E.	450	IM	S.R.
150	G.E.	600	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	Al. Ch.	1200	AR	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	MT	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CS	S.C.

MOORHEAD ELECTRICAL MACHINERY CO.
Mailing Address
P. O. Box 7991C
Pittsburgh 16, Penna.
(Est. 1919)
Office and Shop
Noblestown Road
Oakdale, Penna.

CLOSEOUTS
GUARANTEED EQUIPMENT
---IMMEDIATE SHIPMENT
BONDED SCALES

All scales *complete* with weighing beam and structural steel.

BONDED heavy duty motor truck scale, platform size 18' x 9', capacity 26 tons. A new scale guarantee. Price is $920.00 new, and it is offered for $645.00.

New 30 ton scale with a 24' x 10' platform. Closing out this $1300.00 value for $950.00.

BONDED heavy duty scale, model 2620B. In use less than 3 months. List price $992.00. Platform 20' x 9'. Capacity 26 tons. New scale guarantee. Offered at $725.00.

New 30 ton scale with 24' x 9' platform and used weighing beam. New guarantee. $885.00.

BONDED 26 ton scale, 24' x 10', model 2624BW. New scale guarantee. Priced at $1180.00 new. We offer it for $825.00.

BONDED heavy duty motor truck scale, platform size 24' x 9', capacity 26 tons. List price is $1135.00. Our price to you is $795.00. New scale guarantee.

BONDED motor truck scale, model 4034BW, a 40 ton scale, with a 34' x 10' platform, regularly priced at $2250.00. Offered with a new scale guarantee at $1740.00, a saving of $510.00.

BONDED heavy duty 2622B scale. Capacity 26 tons, with 22' x 9' platform. In use less than 6 months. New scale guarantee. Priced list at $1060.00. This is a bargain at $725.00.

BONDED CRUSHERS

BONDED 1920C double-roll crusher with claw teeth. Roll size 19" x 20". These are the new type improved teeth for clean breaking with minimum of fines. Used only short time before trading in on larger model. New price $1144.00. Priced to go at $745.00, with new crusher guarantee.

BONDED 1216C crusher. Rolls 12" diameter, 16" long. Used less than one week. Designed for producing stoker coal. This is a trade-in that sold new for $479.00, and is specially priced at $395.00.

BONDED 1940DD crusher. Double roll, double-drive with claw teeth. Rolls 40" long, 19" diameter. Another trade-in on other Bonded equipment. Guaranteed same as new crusher. New price $1483.00; offered subject to prior sale at $1000.00.

BONDED 2836C crusher. Roll diameter 28"; roll width 36". Repossessed after 3 months. Sells new for $3382.00; offered with new crusher guarantee at $1790.00.

BONDED VIBRATING SCREENS

Demonstrator of Bonded 3514B screen. 3 deck, 5' x 14', heavy duty eccentric shaft. Used only at machinery shows, etc. Same guarantee as new equipment. New ones cost $5082.00, but you can have this for $3550.00 including screen cloth to your specifications.

BONDED heavy duty screen, model 3388, 3 decks, 3' x 8'. Used for 3 months on sawdust screening, and so it's hardly had any load on it at all. Guaranteed same as new screen. You save over $500.00 by buying this one, screen cloth and all, for $1300.00.

BONDED heavy duty screen model 2488, 2 decks, 4' x 8'. Traded in on longer screen. New equipment guarantee. A bargain at $1385.00, complete with the screen cloth you need.

Model 138A Bonded screen. One deck, 3' x 8'. Another mining show and factory demonstrator. New equipment guarantee. $787.00 new; will sell for $535.00.

A BONDED screen very much like the 136A. Single deck, 3' x 6'. Equivalent to a new screen; used about 5 weeks, then repossessed. $665.00 new; offered at $425.00.

PREVIOUS MODEL IDLERS
BRAND NEW!

All steel troughing idlers and return rollers. Closing out to make way for new models. Prices have been cut 25%. Buy while they last at these new low prices.

3-roll Troughing Idlers for these sizes:

14" belt	$16.80	24" belt	$18.75
16" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
	42" belt	$21.00	

1-roll Return Idlers for these sizes:

14" belt	$6.38	30" belt	$8.25
16" belt	6.75	36" belt	8.75
24" belt	7.50	42" bet	9.50
	48" belt	$10.25	

Bonded Scale & Machine Co.

2190 S. Third Street Columbus, Ohio
PHONES: GArfield 2186; FRanklin 6-8898, Evenings

1—15 HP AC Slip-ring 1150 RPM Motor
2—20 HP Gen. Elec. Slip-ring 1200 RPM
1—30 HP West. Slip-ring 840 RPM
1—35 HP AC Slip-ring 850 RPM
4—1 HP West. Squirrel Cage 1200 & 1800
1—2 HP Louis-Allis Squirrel Cage 1140 RPM
5—5 HP Gen. Elec. Squirrel Cage 860 to 1800 RPM
2—10 HP Gen. Elec. BB Squirrel Cage 1160 RPM
5—15 HP Gen. Elec. BB Squirrel Cage 1160 RPM
3—20 HP Gen. Elec. BB Squirrel Cage 1170 RPM
1—25 HP Gen. Elec. Squirrel Cage 600 RPM
1—25 HP Gen. Elec. Squirrel Cage 1200 RPM
1—25 HP Crocker-Wheeler Squirrel Cage 1740 RPM
1—50 HP West. Squirrel Cage 1710 RPM
New and Used Single Phase Motors from ¼ HP to ½ HP
1—Sullivan LW-6 Wagon Drill
2—500 Gal. Fuel Oil Tanks
1—5 HP Sullivan Turbinair 2-drum Slusher Hoist, 1100# rope pull, with scraper bucket
1—Leadville Tugger Air Hoist, 1000# rope pull
2—7½ ton Goodman Trolley Locomotives, 36" ga.
1—Mine Cage, 36" between guides
1—Double deck Mine Cage, 38" between guides
1—18" Belt Conveyor, 35' long—Motorized
1—5-turn #24-A Humphreys Spiral Concentrator with rack
1—12" Jeffrey Blower Fan—Motorized
1—18" dia. x 26" face Dings Magnetic Pulley, complete with drive and motor
1—24" x 24" Jeffrey Sgl. Roll Coal Crusher
1—36" American Ring Type Coal Crusher
1—50 Ton Truck Scale
1—90 cu.ft. Card Rocker Dump Car, 36" ga.
7—1 Ton Card R.B. Pit Cars
1—Bucket Elevator on 8" belt, 20' centers, complete with 3 HP Gear Motor
1—CE-7 Sullivan AC Coal Cutter
1—3200' Aerial Tramway
1—750' Jig-back Tram
7 Tons 65# Rail
20 Tons 85# Rail
Enclosed Safety Switches — 30 amp to 200 amp.
Cast Iron Pipe — 4" to 8"

CONTACT US FOR DEPENDABLE RECONDITIONED MINING MACHINERY

FLORENCE MACHINERY AND SUPPLY CO.

Suite 904, Equitable Bldg. C. J. Parrish, Mgr. Denver 2, Colo.

M-G SETS—AC to DC

500 KW G.E. syn. converter, DC 275 v.
300 KW Whse. DC 600 v. Synch. Motor, 2300 v.
300 KW Allis Ch. DC 250 v., motor, 2200 v.
200 KW Whse. DC 275 v., synch. motor, 2300 v.
150 KW Whse. DC 275 v., motor 2300 v.
200 KW G.E. DC 125 v., syn. motor 440 v.
100 KW G.E. DC 275 v., motor, 2300/4000 v.
75 KW Whse. DC 250 v., motor, 2200/440 v.

Large Stock Whse. & late model D.C. motors.
Send for Complete New Catalog.

ARTHUR WAGNER CO.
1433 W. Randolph St. Chicago 7
ELECTRIC MOTORS · GENERATORS

PRICED TO SELL
USED MINING MACHINERY
ELECTRICAL EQUIPMENT

45 ft. bucket elevator 100 ton per hour.
4 track tripple and shaker screens.
American ring crusher No. 24.
Ottumwa box car loader 30 H.P. motor.
Railroad car puller.
3 mining machines (coal cutting) Sullivan C.E. 7-30 H.P. 440 volt, 60 cycle.
2—150 H.P.—H.R.T. 150 P.S.I. boilers.
1—125 H.P.—H.R.T. 150 P.S.I. boiler.
1—150 H.P.—125 lb. P.S.I. Scotch marine boiler.
Electric mine hoist G.E. motor 52 H.P. 1600 Ft. 7/8 cable.
2—General Electric A.C. generators, type A.T.B.-36-250-200, 3 phase, 250 KVA form E.K.W. 250 PF-1, 2300 volts, 628 amps, speed 200.
Large assortment of electric motors from 3 H.P. up to 50 H.P.
Transformers from 3 KVA to 75 KVA.

ALBUQUERQUE IRON & METAL CO.
1012 N. 1st St.
Albuquerque, New Mexico

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28 SURPLUS NEW BELT CONVEYORS

30 INCH	1-136' — 1-418' — 2-1500' Long.	1-270' — 2-500' —	2-350' — 1-1100' &
36 INCH	1-160' — 1-400' — 1-1600' Long.	2-350' — 1-590' —	1-320' — 2-1080' &
42 INCH	1-144' — 1-575' — 1-1500' Long.	1-290' — 2-700' —	1-377' — 1-800' —

3 SURPLUS NEW VIBRATING SCREENS
ALLIS CHALMERS 6' x 14' — 2 Deck
RYPL-FLO

LOCOMOTIVES

60 TON PLYMOUTH PROPANE
45 TON PLYMOUTH DIESEL
10 TON DAVENPORT GAS

STANHOPE, 60 E. 42nd St., N. Y. 17

FOR SALE
JOY & SULLIVAN EQUIPMENT

1947 & 1948 MODELS
Excellent Condition — 250 Volts DC
Permissible Type

(5) 11B, (6) 7B, (1) 7AU CUTTERS, (2) 42D SHUTTLE CARS BATTERY OPERATED, (3) PL11-7 ELEVATING CONVEYORS, (2) T1 MINING MACHINE TRUCKS, (2) JEFFREY 8' STRAITFLO MINE FANS, (3) SULLIVAN CD25 COAL DRILLS, (1) JOY PP3 POSTPULLER; ALSO TROLLEY LOCOMOTIVES, 8 TON 42" GA., 8, 10 TONS 36" GA.

NEW ENGLAND INDUSTRIES, INC.
39 BROADWAY — NEW YORK CITY
WHitehall 3-1965

FOR SALE

McNally-Norton Pick Breaker
60" —— Type "A"
Coal Sizing without crushing.
This unit is not new but is in excellent condition.

GRAFTON COAL COMPANY
P.O. Box 1946 Clarksburg, W. Va.

"For Sale — 1600 ft. of new Carlon E plastic pipe, complete with couplings and clamps. Priced at 2/3 original cost for immediate shipment. Roberts and Schaefer Company, 130 North Wells Street, Chicago. Phone — Central 6-7292."

LOCOMOTIVES

4—10 ton Atlas, battery, 36" ga.
2—8 ton Goodman, battery, 36" ga., permissible type
2—8 ton General Electric, battery, 36" ga.
2—7 ton General Electric, battery, 36" ga., permissible type
3—6 ton Ironton, battery, 36" ga.
1—6 ton Atlas, battery, 36" ga.
1—4 ton Atlas, battery, 36" ga.
1—4 ton Mancha, battery, 24" ga.
1—2½ ton Jeffrey, battery, 36" ga.
1—2 ton Whitcomb, battery, 24" ga.
1—4½ ton Goodman, Trolley, 36" ga.
1—5 ton Jeffrey, trolley, 36" ga.
1—6 ton Goodman, trolley, 36" ga.
1—3 ton Whitcomb, gasoline, 24" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3— 5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutters
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—88U Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
6—Jeffrey Aerodyne midget permissible blowers
3—Jeffrey Aerodyne midget blowers

SCALES

1—100 ton Fairbanks railroad scale
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—20 ton Fairbanks springless dial type truck scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Link Belt bucket elevator, 50' centers, 18" x 10" x 9" buckets
1—Link Belt bucket elevator, 50' centers, 10" x 6" x 6" buckets
1—Link Belt bucket elevator, 60' centers, 6" x 4" x 4" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8" centers, 36" wide
1—Jeffrey Drag Conveyor, 88'6" centers, 36" flights
1—Jeffrey Drag Conveyor, 72' centers, 30" flights
1—Jeffrey Drag Conveyor, 67' centers, 30" flights
1—Jeffrey Drag Conveyor, 69'6" centers, 28" flights
1—Link Belt Drag Conveyor, 50' centers, 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

12400#—weatherproof single conductor wire, 350000 CM
3600'—300000 CM wire
16600'—#4 rubber covered single conductor, 600V
3800'—#5 Parkway cable, 3 con., 7200 volt
2977'—#8 Parkway cable, 3 con., 7200 volt
1368'—#10 Parkway cable, 3 con., 7200 volt
547'—#2 3-conductor Tirex, 600 volt
3400'—#6 3 con., Tirex, 600 volt
1000'—#12 4-con., Tirex, 600 volt
12780'—1/0 rubber covered 1 con., 600 volt
3842#—#2 solid bare copper hard drawn
1725#—#4 solid bare copper hard drawn
6000'—1/0 solid bare copper hard drawn

PIT CARS

125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

RAIL

16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

TIPPLES

2 complete tipple buildings and machinery, each capable of 1000 to 1500 tons per day production

Send for free copy of illustrated booklet describing the famous Allen Lamp collection.

MORSE BROS. MACHINERY CO.

2900 BRIGHTON BLVD. **EST. 1898** **DENVER 1, COLO.**

CARLYLE
INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — FIRE, WATER, SUCTION, AIR, STEAM AND WELDING HOSE

WHY WAIT

We have 8 to 48

RUBBER CONVEYOR BELTING

TOUGH COVERS—Heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.
STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.
FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
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1—200 KW Ridgeway synchronous motor generator set, 2300 volt AC, 250-275 volt DC, 1200 rpm, complete with switchboard.

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2—150 KW General Electric synchronous motor generator set, 2300 volt AC, 250-275 volt DC, 1200 rpm, switchboard complete with automatic circuit breakers.

1—100 KW General Electric synchronous motor generator set, 2300 volt AC, 250 volt DC, 1200 rpm, complete with switchboard.

1—75 KW Westinghouse motor generator set, 220 volt AC, 250 volt DC, complete with switchboard.

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1—300 KW General Electric synchronous rotary converter, type HCC-6, 275 volt, 1200 rpm, 2300/4000 volt AC, complete with automatic switchboard.

2—200 KW General Electric synchronous rotary converter, type HCC-6, 275 volt, 1200 rpm, 2300/4000 volt AC, complete with automatic switchboard.

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2—Jeffrey 35BB shortwall mining machines, with 7½' cutter bars, complete with trucks.

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1—36 x 36 Jeffrey single roll crusher.
1—24 x 48 McNally Pittsburg double roll crusher.
1—30 x 36 United Iron Works single roll crusher.
1—24 x 24 Hercules single roll crusher.
1—24 x 24 Webster single roll crusher.
1—24 x 24 Stevens Adamson single roll crusher.
1—24 x 24 Jeffrey single roll crusher.
1—12 x 16 Eagle Iron Works double roll crusher.
1—48" McNally Pittsburg vertical pick breaker.
2—American Pulverizer Company ring roll crushers.

LOCOMOTIVES

MAKE	TYPE	GAUGE
1—20 ton Goodman	36—AO4T	42"
1—15 ton Jeffrey	MH 110	42"
2—13 ton Jeffrey	MB-Class: 26E	42"
1—10 ton Jeffrey	MH 110	42"
3—8 ton Goodman	32AO4T	36"
1—8 ton Goodman	32AO4T	42"
1—8 ton Westinghouse	4-2-35-C-437	36"
5—6 ton General Electric	HM 821A	42"
1—6 ton General Electric	HM 703B	42"
1—6 ton Jeffrey	MH 64	42"
1—6 ton battery	Edison batteries	42"
9—5 ton General Electric battery	Exide ML batteries	42"

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1—48" x 102" Robbins Gyrex, double deck, style C-700 vibrator.
1—4' x 10' Stevens Adamson, two deck vibrator.
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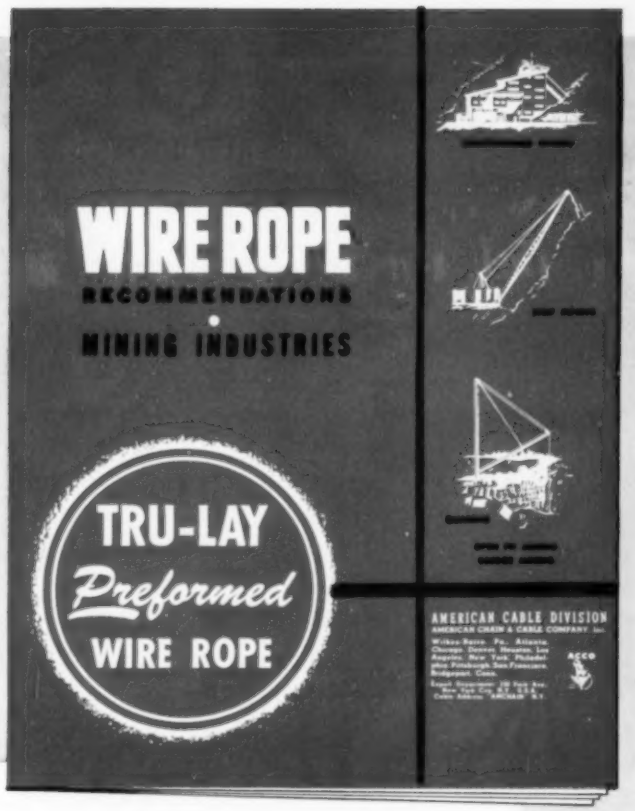

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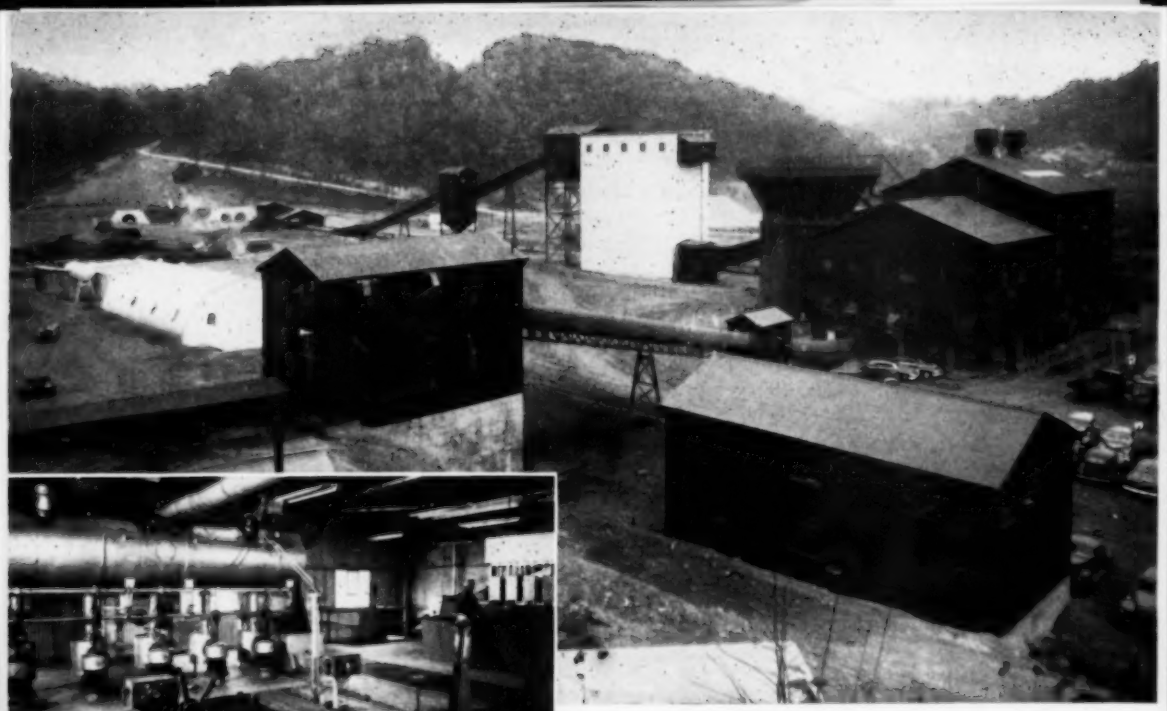

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